"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 17041-63

S/207/63/000/002/020/025

Heat capacity of tantalum...

where u -- energy of the creation of vacancies, which turns out to be equal to 67 kcal/g-at. This deviates negligibly from the values calculated by K. A. Osipov (Ref. 16: DAN SSSR, 1958, v. 121, No. 4; Ref. 17: DAN SSSR, 1958, v. 121, No. 5). It agrees also with the self-diffusion acrivation energy (R. L. Eager and D. B. Langmuir Ref. 18: Phys. Rev., 1953, vol. 89, No. 4) and is roughly a third of the heat of evaporation. There are 2 figures.

SUBMITTED: December 27, 1962

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAFTMAKHER, Ya. A.

TITLE: Seminar on refractory metals, compounds, and alloys (Kiev, April 1963).

SOURCE: Atomnaya energiya, v. 15, no. 3, 1963, 266-267

ACCESSION NR: AP3008085

Ya. A. Kraftmakher. Heat capacity of W, Ta, and Nb.

V. M. Amonenko and others. Expansion coefficients of Zr, Nb, Mo, Ta, and W.

N. V. Ageyev, M. S. Model'. Expansion coefficients of chromium-base alloys.

S. N. L'vov, V. F. Nemchenko. Temperature dependence of emf and resistivity of Cr, Ti, V, and their borides, carbides, and nitrides; Ettingshausen-Nernst effect in titanium, TiB_2, TiC, and TiN.

N. V. Kolomoyets. The emf of chromium-group metals and their alloys.

G. V. Samsonov and others. Superconductivity and thermal-electron properties of refractory compounds.

D. A. Prokoshkin and others. Magnetic, optical, and other properties of refractory elements and the oxidation resistance of beryllides of refractory elements.

Card 10/11

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAFTMAKHER, Ya.A.

Vacancy formation in niobium. Fiz. tver. tela 5 no.3:950-951 Mr '63.
(MIRA 16:4)

1. Institut teplofiziki Sibirskogo otdeleniya AN SSSR, Novosibirsk.
(Niobium—Thermal properties)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAFTMAKHER, Ya. A.

"Heat capacity of tungsten, tantalum, and niobium at high temperatures"

Seminar on production methods, physical properties, and electron structure of refractory metals, compounds, and alloys, organized by the Institute of Powder Metallurgy and Special Alloys AS Ukr SSR, Kiev, 25-29 April 1963. (Teplofizika vysokikh temperatur, No. 1, 1963, p. 156)

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

ACCESSION NR: AP4013513 S/0181/64/006/002/0503/0505

AUTHOR: Kraftmakher, Ya. A.

TITLE: The formation of vacancies in molybdenum

SOURCE: Fizika tverdogo tela, v. 6, no. 2, 1964, 503-505

TOPIC TAGS: heat capacity, vacancy, molybdenum, self diffusion, metal physical property

ABSTRACT: The author has studied the formation of vacancies by direct measurement of heat capacity at high temperatures (1300-2500°K). The vacancy concentration in molybdenum may be defined by the expression $C = 300 \exp\left(\frac{-2.24}{kT}\right)$. At the melting point the concentration reaches 4.3%. Of all metals yet studied, the greatest concentration is observed in molybdenum. Secondary heat capacity of molybdenum, as a result of vacancy formation, amounts to 2.2 kcal/g atom at the melting point. The formational energy of vacancies in molybdenum is slightly less than half the activation energy of self-diffusion (which has been determined to be 4.7-5.0 ev by

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ACCESSION NR: AP4013513

different authors). The vacancy concentration in molybdenum may also be expressed in the form $c = \alpha\exp(5.7)\exp(\frac{-2.2h}{kT})$, which means that the entropy of vacancy formation in molybdenum is 5.7 k. "The author thanks P. G. Strelkov for his interest in the work and for a number of valuable remarks, and he thanks A. A. Isakov for his aid in making the measurements." Orig. art. has: 2 figures and 4 formulas.

ASSOCIATION: Institut teplofiziki SO AN SSSR, Novosibirsk (Institute for the Physics of Heat SO AN SSSR)

SUBMITTED: 20Aug63 DATE ACQ: 03Mar64 ENCL: 00

SUB CODE: MM, GP NO REF SOV: 011 OTHER: 009

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAFTMAKHER, Ya.A. (Novosibirsk); CHEREMISINA, I.M. (Novosibirsk)

Modulation method of studying thermal expansion. PMTF no.2:114-115 Mr-Ap '65. (MIRA 18:7)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 25115-65 EWT(m)/T/EWP(t)/EWP(b) IJP(c) JD/JG
ACCESSION NR: AP5003423 S/0181/65/007/001/0123/0126

AUTHORS: Kraftmakher, Ya. A.; Lanina, Ye. B. 26 24 B

TITLE: Energy of vacancy formation and vacancy concentration in platinum 71

SOURCE: Fizika tverdogo tela, v. 7, no. 1, 1965, 123-126

TOPIC TAGS: platinum, vacancy formation, vacancy concentration, specific heat, electric resistivity

ABSTRACT: Inasmuch as earlier methods did not yield reliable data on the equilibrium concentration of vacancies in platinum, the authors studied the formation of vacancies by measuring the electric resistivity and the specific heat at high temperatures (1000--2000K). The measurements were made on wires 0.05 mm in diameter and 100--250 mm long. The electric resistance of the samples at high temperatures was determined directly from the radiated power at temperatures above 1500K, and from the quadratic dependence of the re-

Card 1/3

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

sistance of the temperature at temperatures between 1000 and 1500K. A modulation method was used to measure the specific heat, as described by one of the authors elsewhere (Kraftmakher, PMTF, no. 5, 176, 1962). The energy of vacancy formation was calculated from the temperature dependence of the increase in electric resistivity and also from the measurements of the specific heat, both methods yielding the same result. A concentration given by the expression $c = 90 \exp(-1.6/kT)$ was obtained, reaching 1% at the melting temperature. The additional resistances, connected with the formation of the vacancies, amount to 2.4 microhm-cm for each per cent of vacancies. The results are in satisfactory agreement with related data by others. The authors thank F. G. Strelkov for interest in the work and for valuable remarks. Orig. art. has: 3 figures and 3 formulas.

ASSOCIATION: Institut teplofiziki SO AN SSSR, Novosibirsk (Institute of Heat Physics SO AN SSSR)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

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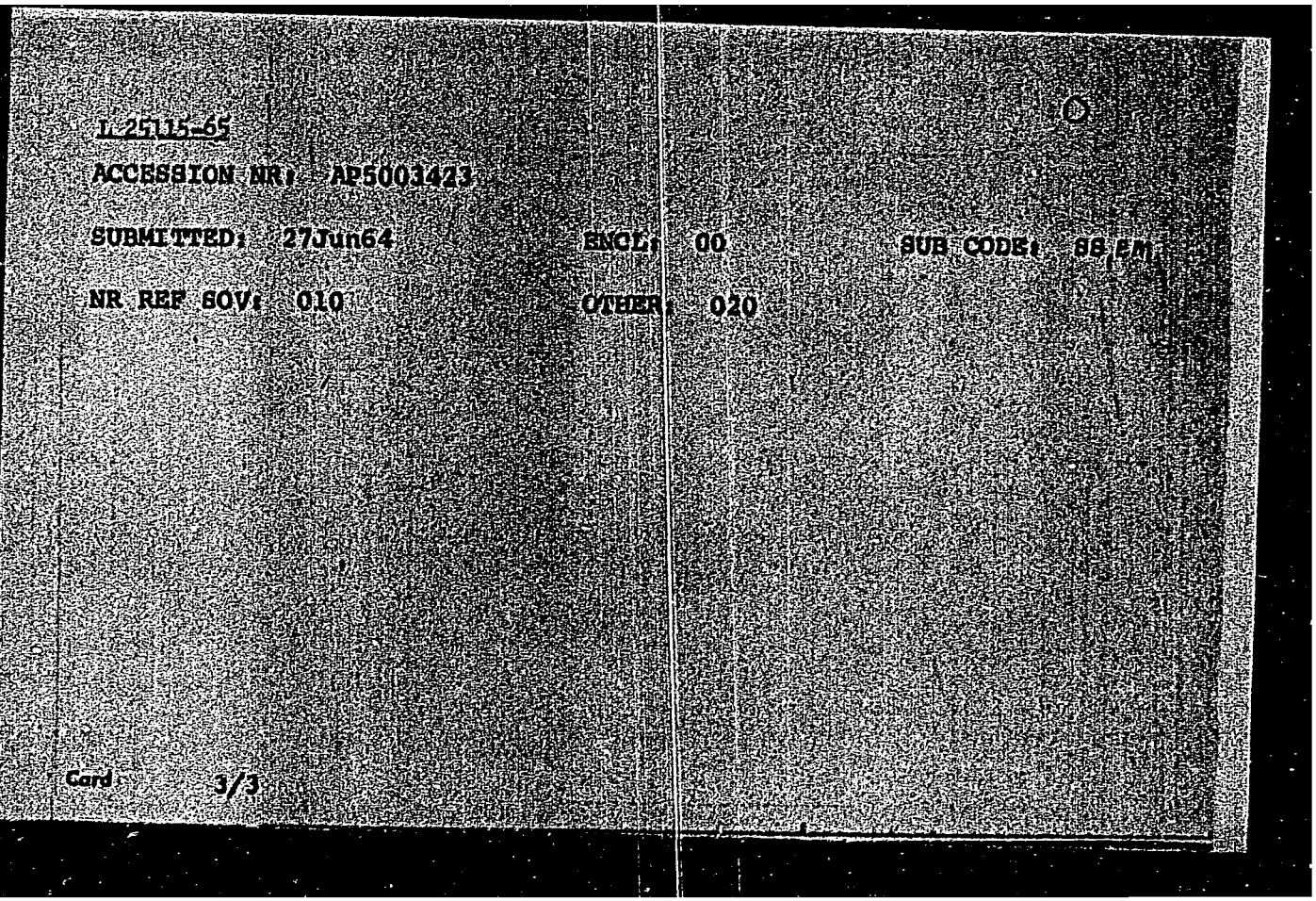

L 25115-65

ACCESSION NR: AP5003423

SUBMITTED: 27Jun64 ENCL: 00 SUB CODE: GE EM

NR REF SOV: 010 OTHER: 020

Card: 3/3

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 6338-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JW

ACCESSION NR: AP5019879 UR/0181/65/007/008/2532/2533

AUTHOR: Kraftmakher, Ya. A.; Romashina, T. Yu.

TITLE: Specific heat of iron near the Curie point

SOURCE: Fizika tverdogo tela, v. 7, no. 8, 1965, 2532-2533

TOPIC TAGS: specific heat, iron, Curie point, optic brightness

ABSTRACT: In view of the lack of consistent experimental data on the specific heat of iron near the Curie point, the authors have measured the specific heat at high temperatures by a modulation method, similar to that described by one of the authors earlier (Kraftmakher, PMTF No. 5, 176, 1962), except that the amplitude of the oscillations of the temperature was determined from the oscillations of its luminosity. The measurements were made in the range 950--1200K on wires of commercially pure iron 0.1 mm in diameter and 100-250 mm long. The samples were heated with current possessing both dc and ac components. The temperature modulation frequency was 30 cps and the amplitude approximately 0.1°. The luminosity was measured with a photoresistance and a selective low-frequency amplifier. The sample temperature was determined from the power radiated from it. The results are shown in Fig. 1 of the Enclosure and show that iron has a logarithmic temperature

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L 6338-66

ACCESSION NR: AP5019879

dependence near the Curie point. The coefficient preceding the logarithm is the same on both sides of the Curie point. "The authors thank P. G. Strelkov, A. Z. Patashinskiy, and V. L. Pokrovskiy for interest in the work and discussions, and also to A. G. Mirnov for supplying the samples." Orig. art. has: 2 figures.

ASSOCIATION: Institut teplofiziki SO AN SSSR, Novosibirsk (Institute of Thermophysics SO AN SSSR)

SUBMITTED: 16Mar65 ENCL: 01 SUB CODE: OP, TD

NR REF SOV: 004 OTHER: 007

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 6338-66
ACCESSION NR: AP5019879

ENCLOSURE: 01

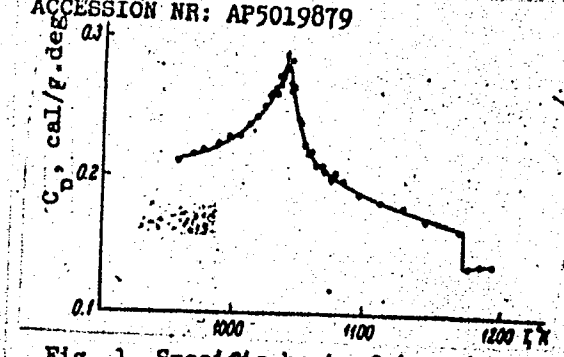

Fig. 1. Specific heat of iron in the interval 950 - 1200K.

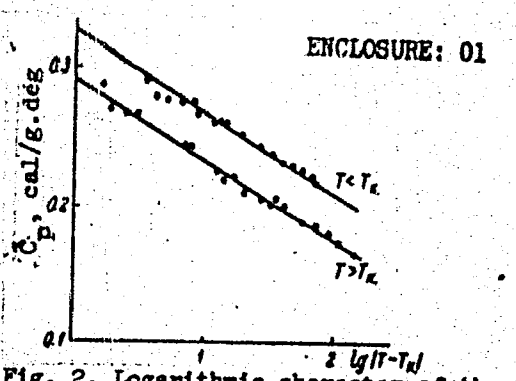

Fig. 2. Logarithmic character of the temperature dependence of the specific heat of iron near the Curie point.

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L 16681-66 EWT(1)/EWP(e)/EWT(m)/EPF(n)-2/EWA(h) WW/JW/WH

ACC NR: AP5021921 SOURCE CODE: UR/0207/65/000/004/0170/0171

AUTHOR: Kraftmakher, Ya. A. (Novosibirsk); Shestopal, V. O. (Novosibirsk)

ORG: none

TITLE: Heat capacity of graphite at temperatures in the 1750°-2850°K range

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 4, 1965, 170-171

TOPIC TAGS: heat capacity, graphite, emissivity

ABSTRACT: The heat capacity of graphite was measured. The study made use of modulation methods and optical pyrometry. Specimens of spectrally pure graphite heated by 50 cps ac current were measured in a vacuum in the 1750°-2200°K range and in an argon atmosphere in the higher (2000-2850°K) range. Heat capacity was calculated according to the formula

$$mc = P/2\omega\theta$$

where P = power; ω = current frequency; θ = amplitude of temperature oscillation. Measurements were based on changes (measured by two light

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L 16684-66

ACC NR: AP5021921

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filters) in the radiant emissivity of the specimens. Color temperature lamps were used to calibrate the photomultiplier tube used in emissivity measurement in the 1700-3000°K range; tungsten filaments were used in the 2100-2550°K range. Results of the measurement of heat capacity of graphite in the 1750-2850°K range shown for five specimens are graphed. Measurements were accurate to ±5%. Results are compared with those of other authors. The authors thank P. G. Strelkov for his interest in the work and N. G. Potapov for preparing the specimens. Orig. art. has: 1 graph, 5 formulas.

SUB CODE: 11, 20/ SUBM DATE: 09Jan65/ ORIG REF: 004/ OTH REF: 008

Card 2/2 SM

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 21223-66 EWT(m)/EWP(t) IJP(c) JD
ACC NR: AP6003817 SOURCE CODE: UR/0181/66/008/001/0283/0284

AUTHORS: Kanel', O. M.; Kraftmakher, Ya. A.

ORG: none

61
59
B

TITLE: Formation of vacancies in zirconium

SOURCE: Fizika tverdogo tela, v. 8, no. 1, 1966, 283-284

TOPIC TAGS: zirconium, crystal lattice vacancy, photoresistance, emissivity, specific heat

ABSTRACT: To determine the energy of formation and concentration of vacancies in zirconium, the authors measured its specific heat high temperatures. Zirconium iodide samples were used in the form of ribbons 0.1 mm thick, 0.5 -- 1 mm wide, and up to 100 mm long. The measurements were made by a modulation method described earlier (PMTF, no. 5, 176, 1962), except that the amplitude of the temperature oscillations was determined from oscillations of its luminosity with the aid of a photoresistance. The sample temperature was calculated from the power radiated on the basis of data on total

Card 1/2

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 21223-66
ACC NR: AP6003817

2

emissivity of zirconium at high temperatures. The measurements were made in vacuum (2×10^{-6} mm Hg), and the temperature modulation frequency was approximately 30 cps. The specific heat was measured in the temperature interval 1300 -- 200K. At temperatures above 1500°, an increase is observed in the specific heat, connected with the formation of vacancies. It is deduced from the experiments that the average energy of vacancy formation is 1.75 ev, accurate to 0.2 ev. The increase in specific heat as a result of vacancy formation is 0.8 cal/g-at-deg at 200K. The concentration of the vacancies reaches 0.7% at the melting temperature. The results obtained do not contradict earlier data on self-diffusion in zirconium. The authors thank B. G. Strelkov for interest in the work and valuable remarks, and A. I. Baykov for supplying the samples. Orig. art. has: 1 figure.

SUB CODE: 20/ SUBM DATE: 09Aug65/ ORIG REF: 004/ OTH REF: 002

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 29301-66 EWT(m)/EWP(t)/ETI IJP(c) JD/JG
ACC NR: AP6012460 SOURCE CODE: UR/0181/66/008/004/1049/1052

AUTHORS: Kraftmakher, Ya. A.; Strelkov, P. G.

ORG: Siberian Branch of All Union Scientific Research Institute of Physicotechnical and Radiotechnical Measurements, Novosibirsk (Sibirskiy filial Vsesoyuznogo nauchno-issledovatel'-skogo instituta fiziko-tekhnicheskikh i radiotekhnicheskikh izmereniy)

TITLE: Energy of formation and concentration of vacancies in metals.

SOURCE: Fizika tverdogo tela, v. 8, no. 4, 1966, 1049-1052

TOPIC TAGS: metal property, crystal lattice vacancy, specific heat, physical diffusion, melting point, high temperature phenomenon

ABSTRACT: The authors summarized the results of measurements of the specific heat of high temperatures for tungsten, tantalum, molybdenum, niobium, zirconium, platinum, copper, gold, silver, aluminum, lead, sodium, and potassium and use these and other data to draw certain conclusions concerning the laws governing vacancy formation in their lattices. Some features of the test procedures used by various authors and their effect on the accuracy of their results are briefly discussed.

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 29301-66

ACC NR: AP6012460

It is shown that in metals with body-centered cubic lattice the self-diffusion is effected by a vacancy mechanism, and not by ring exchange as is sometimes assumed. The energy of vacancy formation in metals is approximately proportional to the melting temperature. Methods of determining the vacancy concentrations are discussed. A table comparing the energy of formation and concentration of vacancies in the various metals, obtained from various sources, is presented. The high values of the vacancy concentrations in metals, obtained by measuring the specific heat at high temperatures, do not contradict the available data on self-diffusion, although there is no direct proof of their correctness. The authors thank I. M. Lifshits for a discussion. Orig. art. has: 1 table.

SUB CODE: 20, 11/SUBM DATE: 09Aug65/ ORIG REF: 015/ OTH REF: 030

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 30099-66 EWT(m)/EWP(t)/ETI IJP(c) JW/JD/HW

ACC NR: AP6012517 SOURCE CODE: UR/0181/66/008/004/1306/1308

AUTHOR: Kraftmakher, Ya. A.

ORG: Siberian Branch, All-Union Scientific Research Institute of Physicotechnical and Radiotechnical Measurements, Novosibirsk (Sibirskiy filial Vsesoyuznogo nauchno-issledovatel'skogo institut fiziko-tekhnicheskikh i radiotekhnicheskikh izmereniy)

TITLE: Specific heat of nickel near the Curie point

SOURCE: Fizika tverdogo tela, v. 8, no. 4, 1966, 1306-1308

TOPIC TAGS: nickel, specific heat, Curie point, adiabatic process

ABSTRACT: Although the specific heat of nickel near the Curie point was measured by many workers, the available data yield no information on the law governing the variation of the specific heat. The author's measurements were made on the temperature interval 300 -- 400C by means of a modulation method described by the author elsewhere (PMTF no. 2, 176, 1962). The measurements were made in a vacuum 10^5 mm Hg on relatively bulky samples in the form of tubes 100 mm long. The samples were heated with commercial ac, modulated in amplitude with a period of 6.4 sec. Because of the relatively low temperatures and large mass of the sample, the adiabatic condition was still satisfied. The results show that

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L 30099-66

ACC NR: AP6012517

specific heat plotted against the logarithm of the difference between the temperature and Curie point yields two straight lines, one for temperature above and the other for temperatures below the Curie point. Empirical equations for the two curves are written out. It is concluded that since the contribution of the logarithmic term to the specific heat in the investigated temperature range was relatively small, one can assert that the temperature dependence near the Curie point is logarithmic only if the alternative function differs sufficiently from logarithmic. The author thanks P. G. Strelkov, A. Z. Patashinskiy, and V. L. Pokrovskiy for interest in the work and a discussion. Orig. art. has: 2 figures and 2 formulas.

SUB CODE: 20/ SUBM DATE: 23Nov65/ ORIG REF: 007/ OTH REF: 013

Card 2/2

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 38883-66 EWT(l)/EWT(m)/EWP(t)/ETI IJP(c) JW/JD/HW

ACC NR: AP6018581 SOURCE CODE: UR/0181/66/008/006/1966/1967

AUTHOR: Kraftmakher, Ya. A.; Romashina, T. Yu. 80 15 B

ORG: Siberian Branch of the All-Union Scientific-Research Institute of Physicotechnical and Radiotechnical Measurements, Novosibirsk (Sibirskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta fiziko-tekhnicheskikh i radiotekhnicheskikh izmereniy)

TITLE: Specific heat of cobalt near the Curie point

SOURCE: Fizika tverdogo tela, v. 8, no. 6, 1966, 1966-1967

TOPIC TAGS: cobalt, specific heat, Curie point, heat measurement

ABSTRACT: The specific heat of the cobalt was measured near the Curie point by a modulation method described elsewhere (PMTF No. 5, 176, 1962). The amplitude of the temperature fluctuations of the samples was determined from the fluctuations of the luminosity, using a photoresistor and a selective low-frequency amplifier. The measurements were made on samples produced by electrolytic precipitation. The temperature was measured with a standard optical pyrometer (EOP-51). The temperature modulation frequency was 30 cps and the amplitude did not exceed 0.5°. The measurements were made in vacuum not lower than 5×10^{-6} mm Hg. The results showed that cobalt has an anomaly in the specific heat near the Curie point, similar in nature to that observed for iron and nickel. The results are well approximated by a logarithmic dependence in the temperature region $|T - T_c| < 50°$, with a mean-square

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

L 38883-66

ACC NR: AI6018581

deviation not exceeding 1.5%. The results also agree with other published data. The jumps in the specific heat at the Curie point are also simply related to those observed for iron and nickel. The authors thank P. G. Strelkov, A. Z. Patashinskiy, and V. L. Pokrovskiy for interest in the work and a discussion. Orig. art. has: 1 figure and 1 table.

SUB CODE: 20/ SUBM DATE: 12Jan66/ ORIG REF: 004/ OTH REF: 003

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

ACC NR: AP7002709 (A) SOURCE CODE: UR/0115/66/000/012/0064/0066

AUTHOR: Kraftmakher, Ya. A.

ORG: none

TITLE: All-Union Conference on thermophysical properties of substances at high temperatures

SOURCE: Izmeritel'naya tekhnika, no. 12, 1966, 64-66

TOPIC TAGS: metal, thermophysical property, ~~high temperature thermophysical property~~, high temperature ~~property~~ research, ~~high temperature physics conference~~ scientific conference

ABSTRACT:

The All-Union conference on thermophysical properties of substances at high temperatures was held 25—30 July 1966 at Novosibirsk. The conference, sponsored by the State Committee of Science and Technology of the Council of Ministers SSSR, by the Academy of Sciences SSSR, and by the Committee on Standards, Measures, and Measuring Instruments, at the Council of Ministers SSSR, was attended by more than 500 representatives of 148 scientific and research institutions who presented more than 200 reports and communications. The majority of the reports were presented at the Section on "Thermophysical Properties of Solid Bodies." Individual sessions dealt with high temperature measurement, specific heat and enthalpy, vaporization, thermal expansion, transfer phenomena in solid bodies and methods of thermophysical experiments.

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

ACC NR: AP7002709

G. S. Ambrok, G. N. Brazhnichenko, I. I. Kirenkov and O. P. Kofanov (VNIIM) reported on a precision method of measuring temperature of plasma sources of light, and on the meteorological investigation of the EV-45 pulse plasma light source, whose radiation capacity in a wide range of wavelengths is close to the radiation capacity of a black body at 40,000K. G. A. Krakhmal'nikova and E. A. Lapina (VNIIM) described methods and emitters and devices for plotting and transmitting the scale of brightness and color temperatures up to 6000C.

A number of reports presented by the Institute of High Temperatures dealt with investigations of the radiation capacity of materials at high temperatures. L. B. Gutnova, A. I. Rekov and E. G. Spiridonov (NIIVT) described the determination of the specific heat of carbon-containing materials. V. P. Yelyntin, I. A. Maurakh and G. M. Sverdlov (Institute of Steel and Alloys) spoke on the experimental determination of the latent heat of fusion of some refractory metals. G. A. Bergman (NIIVT) reported on the approximation of the enthalpy data and on calculations of the thermodynamic functions of refractory metals in a wide range of temperatures. Ya. A. Kraftmakher and P. G. Strelkov (Solid State Physics Laboratory) described results of measurements of specific heat at high temperatures and of the determination of energies of formation and equilibrium concentrations of vacancies in metals. L. P. Filippov, A. V. Arutyunov, I. N. Makarenko, I. P. Mardykin, L. N. Trukhanova and B. N. Khysainova (MGU) reported on the investigation of thermal

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

properties of solid and liquid metals at high temperatures, carried out at the Department of Molecular Physics. Ye. K. Zavadovskaya and N. M. Timoshenko spoke on the measurement of energy stored by ion crystals at irradiation. A. A. Ganichev, Yu. S. Rutgayzer, and A. M. Shereshevskiy (SKB of Analysis Instrument Building AN SSSR) described the MKh 1308 mass spectrometer for studies of evaporation of hard-to-volatize substances. Mass spectroscopic investigation of the evaporation of solid bodies was discussed in the reports of G. A. Semenov (LGU), L. N. Gorokhov, and L. A. Aleshko-Ozhevskaya (NIIVT, MGU) and A. V. Gusarov and L. N. Gorokhov (NIIVT). V. V. Fesenko, A. S. Bolgar, S. P. Gordiyenko, Ye. A. Guseva, A. G. Turchanin and E. A. Ryklis (Institute of the Problems of the Science of Materials AN UkrSSR) reported on an investigation of the evaporation rate and thermodynamic properties of refractory compounds. Problems of the heat expansion were discussed by V. Ya. Chekhovskiy and V. A. Petukhov (NIIVT), B. Ye. Neymark and B. R. Brodskiy (All-Union Institute of Heat Engineering) and P. G. Strelkov, I. I. Lifanov and N. G. Sherstyukov (VNIIFTRI).
G. A. Gogotsi and G. N. Tret'yachenko (Institute of the Problems of the Science of Materials AN UkrSSR) spoke on the thermal shock resistance and thermophysical properties of brittle materials. V. A. Vertogradskiy, V. A. Yefimov and V. N. Kirillov (Moscow) described the method and equipment for determining the specific heat, heat conductivity and thermal diffusivity of heat insulating materials. Methods of thermopysical measurements were discussed also by A. A. Yarkho (Kharkov), G. A. Surkov (Institute of Heat and Mass Transfer AN BSSR) and V. A. Vertogradskiy (Moscow). E. E. Shpil'man,

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V. L. Mal'ter and M. B. Gutman (Institute of Electrothermal Equipment) spoke on measurements of the effective heat conductivity of porous heat insulation materials at high pressures and temperatures. D. L. Timrot, V. Yu. Voskresenskiy and V. E. Peletskiy (NIIVT), in reporting on the electric conductivity, heat conductivity and integral radiation capacity of refractory metals at high temperatures, stated that the obtained data on Lorentz numbers indicated the presence of a small (max. 15%) lattice component of heat conductivity at temperatures above 1000C.

I. I. Shvets and F. F. Lezhenin (Institute of Technical Thermophysics AN UkrSSR) described the results of investigation of the heat conductivity of silicon carbide at high temperatures. V. I. Dauknis, V. I. Martinaytene, G. A. Prantskyavichus, K. K. Stukonis and V. L. Yurenas (Institute of Power and Electrical Engineering AN LithSSR) reported on the mechanical and thermophysical characteristics of zirconium dioxide at temperatures up to 2300K. I. S. Myanskas, G. A. Grinute, R. I. Abraytis, A. Ya. Peras and V. V. Yanulis (Institute of Power and Electrical Engineering AN LithSSR) described the erosion of zirconium dioxide-base refractory materials in the products of combustion of gas-oxygen mixtures.

M. N. Ivanovskiy, V. I. Subbotin and their co-workers (FEI) presented a number of reports on the mechanism of formation of the liquid phase and heat transfer at the drop condensation of mercury, on the phase and diffusion resistances at the condensation of potassium, sodium and lithium, and on the effect of impurities on the thermophysical properties of alkali metals. A. N.

Card 4/6

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ACC NR: AP7002709

Solov'yev and B. Ye. Semyachkin (Institute of Thermophysics, Siberian Division, AN SSSR) discussed the electric conductivity of molten sodium, potassium and rubidium at temperatures up to 1700K. E. E. Shpilrayn, K. A. Yakimovich, D. N. Kagan and A. A. Shelyagina (NIIVT) spoke on the thermodynamic properties of condensed alkali metals. P. L. Kirillov (Obninsk Department of the MIFI) discussed critical parameters of alkali metals. E. E. Shpil'rayn and V. A. Fomin (NIIVT) described measurements of the viscosity of molten alkali metals at temperatures up to 1000C. A. N. Solov'yen and O. P. Makarova discussed the surface tension of molten alkali metals.

I. K. Kikoin, A. P. Senchenkov, E. B. Gel'man, M. M. Korsunskiy and S. P. Naurzakov (Moscow) reported on the electric conductivity and stable equation of metal vapor. D. L. Timrot and A. S. Umanskiy (NIIVT) described experimental investigations of the heat conductivity of gases at high temperatures. N. B. Vargaftik and A. A. Voshchinin (Moscow Aviation Institute) reported the results of the experimental investigation of the heat conductivity of potassium and sodium vapors.

R. I. Solukhin (Institute of Hydrodynamics SO AN SSSR) reported on the kinetics of exothermic reactions in shock waves. V. A. Bondar', L. I. Kiselevskiy and V. D. Shimanovich described the spectroscopic and thermophysical investigation of axisymmetrical plasma with a maximum temperature of up to 100,000K. V. A. Dmitriyevskiy, O. P. Russkov, A. P. Senchenkov, E. B. Gel'man, V. Ye. Kudryavtsev and V. V. Malyshev reported on heating uranium hexalfluoride in a strong neutron flux of a pulsed graphite reactor.

Card 5/6

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ACC NR: AP7002709

The Proceedings of the conference will be published in 1967. The Publishing House for Standards is planning to publish two volumes: "Thermophysical properties of solid bodies at high temperatures" and "The Thermophysical properties of liquids and gases at high temperatures". The next conference on the thermophysical properties of substances at high temperatures is planned for 1968.

SUB CODE: 11, 20/ SUBM DATE: 22Aug66/ ATD PRESS: 5112

Card 6/6

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

SOLC, J.; KRAFTOVA, I., technicka spoluprace; KOSTKOVA, E., technicka spoluprace.

Ketosis in fasting in children. Cesk pediat 18 no. 3:220-227 '63.

1. Detska klinika lekarske fakulty KU v Plzni, prednosta doc. dr. J. Lukes.
(FASTING) (BLOOD SUGAR) (RESPIRATORY FUNCTION TESTS)
(FATTY ACIDS) (ICE TONE BODIES) (ACIDOSIS)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

SOLC, J.; Technicka spoluprace: KRAFTOVA, I.

Excretion of ketone bodies in the urine of children. Cesk. pediat 18 no.6:481-486 Je '63.

1. Detska klinika lekarske fakulty KU v Plzni, prednosta doc. dr. J. Lukes.

(KETONE BODIES) (URINE)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

SOLC, J. Technicka spoluprace: KRAFTOVA, I.

Ketosis in febrile disease. I. Glycemia, pyruvic, acid, lactic acid, alphaglutaric acid, nonesterified fatty acids and ketonemia in fever. Cesk. pediat. 19 no.7:577-584 Jl'64

1. Detska klinika lekarske fakulty KU [Karlovay university] v Plzni; prednosta: doc. dr. J.Lukes.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

MITYUREV, Valentin Konstantinovich[Mitiur'ov, V.K.]; KRAGEL', Ye.O.[Krahel', IE.O.], red.

[International system of units and its study in school; a handbook for teachers] Mizhnarodna systema odynyts' ta ii vyvchennia v shkoli; posibnyk dlia vchyteliv. Kyiv, Radians'ka shkola, 1963. 176 p. (MIRA 18:3)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I. V.

KRADEL'SKIY, I. V.

"On Jumps in the Friction," Zhur. Tekh. Fiz., 14, Nos. 4-5, 1944

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

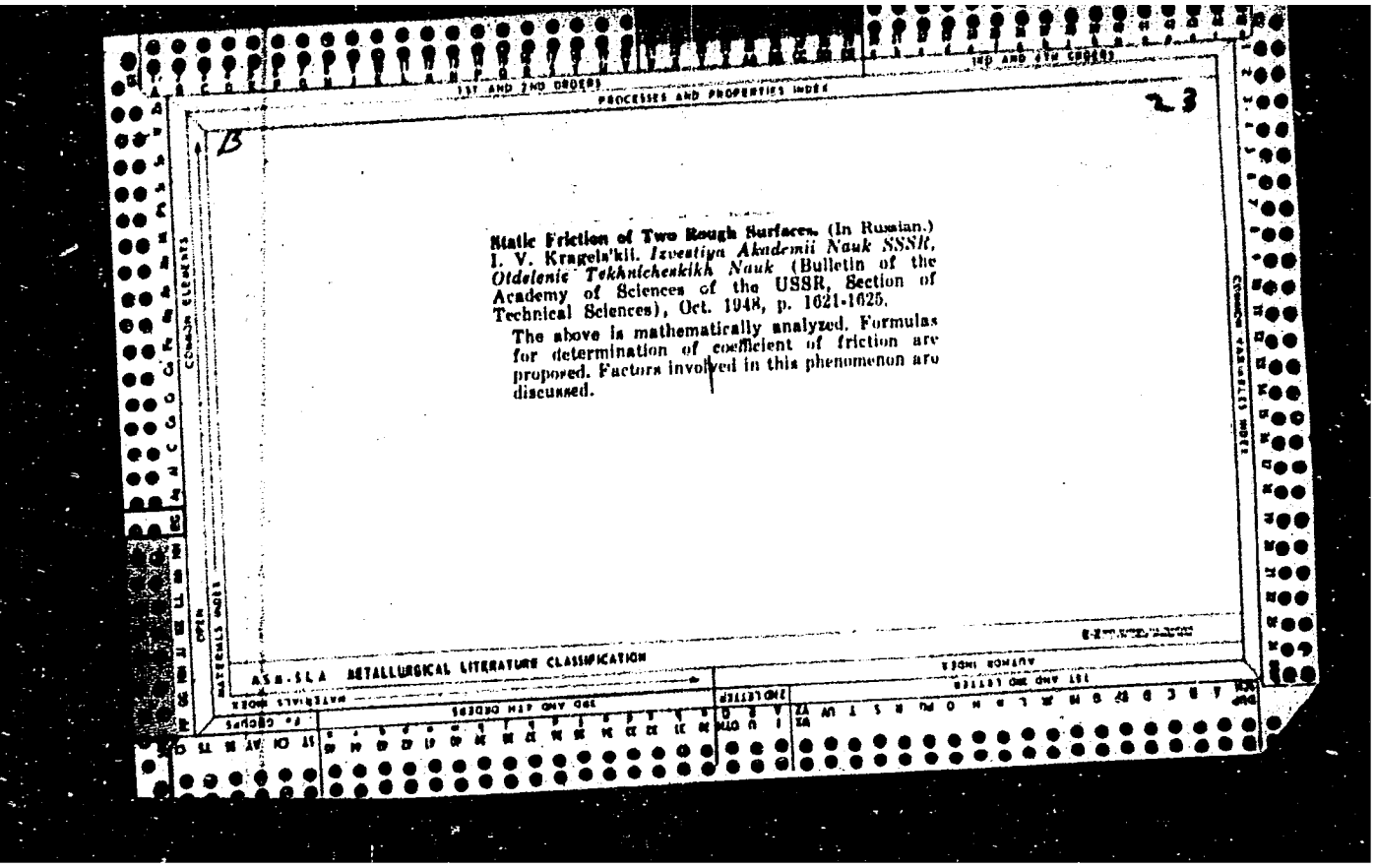
KRAGEL'SKIY, I.V.

KRADEL(SKIY, I. V.

"Influence of the Duration of a Fixed Contact on the Value of the Force of Friction," Zhur. Tekh. Fiz., 14, Nos. 4-5, 1944

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1



Static Friction of Two Rough Surfaces. (In Russian.) I. V. Kragel'skii. *Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk* (Bulletin of the Academy of Sciences of the USSR, Section of Technical Sciences), Oct. 1948, p. 1621-1625.

The above is mathematically analyzed. Formulas for determination of coefficient of friction are proposed. Factors involved in this phenomenon are discussed.

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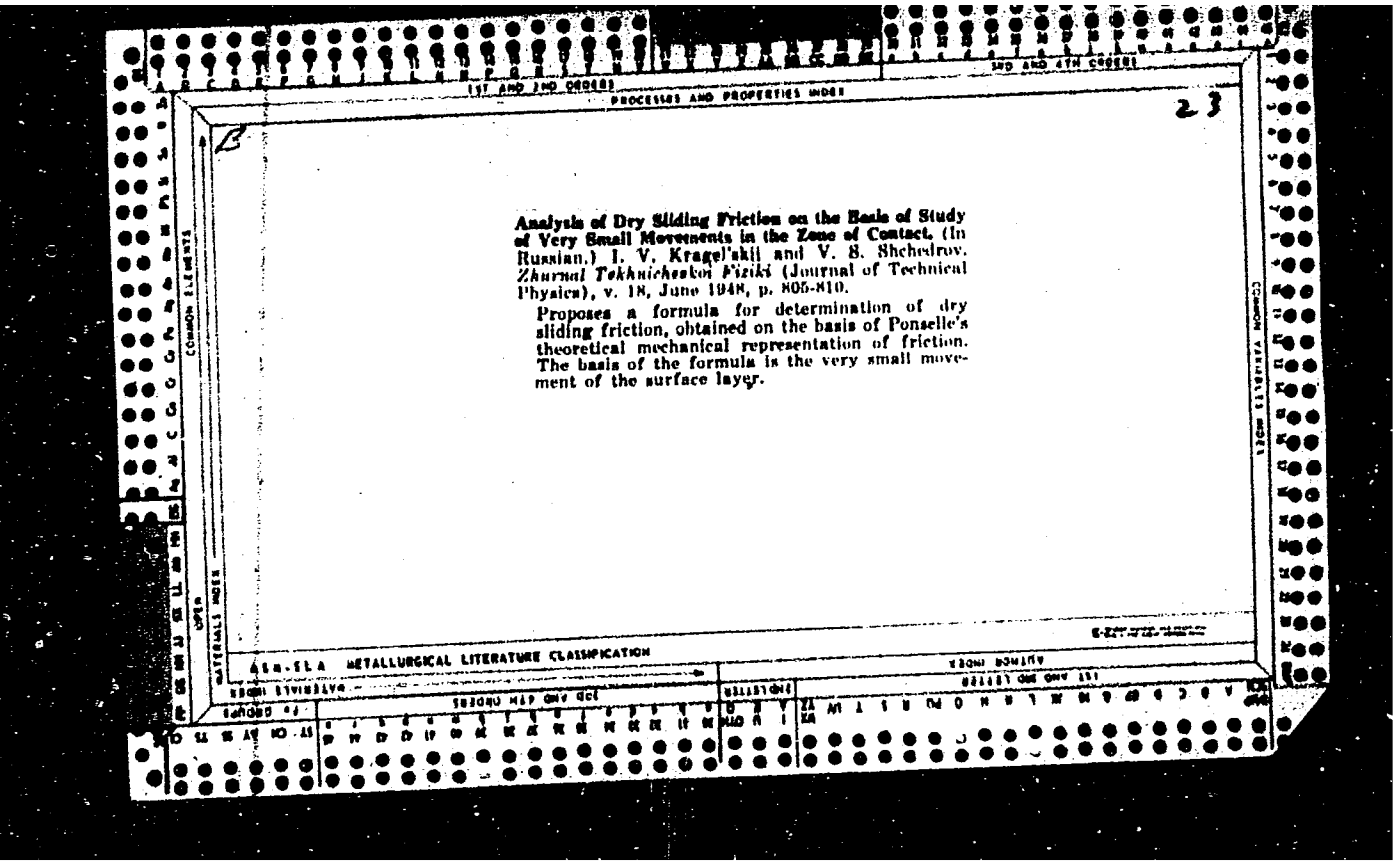
"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1



Analysis of Dry Sliding Friction on the Basis of Study of Very Small Movements in the Zone of Contact. (In Russian.) I. V. Kragel'skii and V. S. Shchedrov. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 18, June 1948, p. 805-810.

Proposes a formula for determination of dry sliding friction, obtained on the basis of Ponselle's theoretical mechanical representation of friction. The basis of the formula is the very small movement of the surface layer.

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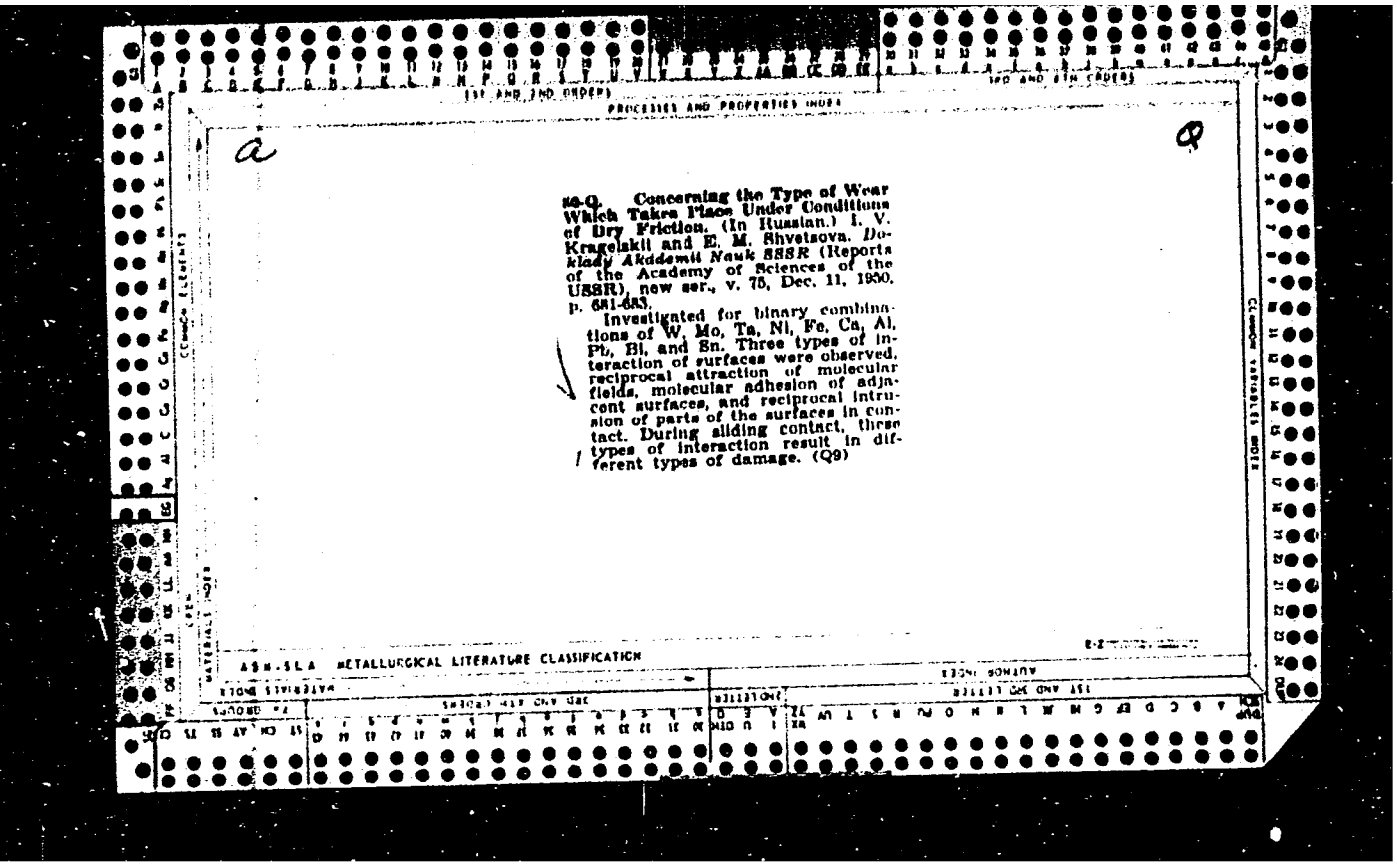

Q9-Q. Concerning the Type of Wear Which Takes Place Under Conditions of Dry Friction. (In Russian.) I. V. Kragelskii and E. M. Shvetsova. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 75, Dec. 11, 1950. p. 681-683.

Investigated for binary combinations of W, Mo, Ta, Ni, Fe, Ca, Al, Pb, Bi, and Sn. Three types of interaction of surfaces were observed, reciprocal attraction of molecular fields, molecular adhesion of adjacent surfaces, and reciprocal intrusion of parts of the surfaces in contact. During sliding contact, these types of interaction result in different types of damage. (Q9)

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGELSKIY, I. V.; and SHAKOV, A. A.; and KONDRATYEVA, A. S.

"On Increasing The Density of Snow By Compression," 1952.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

AMR

Lubrication; Bearings; Wear

2525. Kragel'skii, I. V., On the calculation of the intensity of wear of rubbing surfaces (in Russian), *Zh. tekh. Fiz.* 22, 1, 44–54, Jan. 1952.

Tests indicate that wear caused by sliding of two surfaces is effected by interaction generated in localized contact "spots." Contacting spots can be considered of two types: destructive spots and preserving spots. The several mechanisms of destruction of a wearing surface, such as scratching, gouging, mechanical lapping, etc., may all be evaluated by numerical, weight, and linear intensities. The over-all wear intensity is obtained as the sum of the individual intensities of corresponding destructions. The magnitude of deformation due to compression A_s serves as a criterion of destruction of contacting asperities.

Expressions are developed for evaluation of the intensity of wear due to abrasion; the validity of these expressions has been verified by test data obtained by various experimenters.

I. M. Tichvinsky, USA

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I.V.

PHASE I TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 474 - I

BOOK Call No.: AF 595007

Authors: SHVETSOVA, YE. M. and KRAGEL'SKIY, I. V.

Full Title: CLASSIFICATION OF SURFACE DAMAGE OF MACHINE PARTS IN CONDITIONS OF DRY AND BOUNDARY FRICTION

Transliterated Title: Treniye i iznos v mashinakh: Klassifikatsiya vidov razrusheniya detaley mashin v usloviyakh sukhogo i granichnogo treniya

PUBLISHING DATA

Originating Agency: Academy of Sciences, USSR. Machine-Building Institute,

Treniye i iznos v mashinakh (Friction and Wear in Machines), Issue VIII

Publishing House: Academy of Sciences, USSR

Date: 1953 No. pp.: 20 (18-38) No. of copies: 2,500

Editorial Staff

Editor: Khrushchov, M. M., Professor

PURPOSE: Report on the work done at the seminar on friction and wear in machines for further study and discussion.

TEXT DATA

Coverage: The authors describe the various existing classifications of the deterioration of machine parts, suggest a new classification, and explain its fundamentals. Then they discuss physical and chemical processes of friction on surfaces and various aspects of damage of machine parts. The article

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Treniye i iznos v mashinakh: Klassifikatsiya vidov razrusheniya detaley mashin v usloviyakh sukhogo i granichnogo treniya

AID 474 - I

discusses the following details; types of interaction - mechanical, molecular; prevention of wear by changing the conditions of interaction; physical - chemical processes on surfaces subject to friction; changes caused by deformation; changes caused by the raised temperature of contacting surfaces; changes caused by chemical action of the surrounding medium; prevention of wear by controlling processes taking place on surfaces subjected to friction; types of damage - scratching, chipping and breaking off (as a result of the non-uniform state of the surface layers of the material); scaling and peeling, micro-destruction (carrying away of minute parts in the process of polishing), sub-surface pulling out; comparison of various types of destruction. At the end of the article, the authors give as an example two charts describing the nature of wear, the characteristics of worn parts, and the ways to handle them. Photos.

This is one of the three articles on this subject written by different authors. All of these articles appeared in the above-mentioned issue of collected essays. The articles are interesting because they show different approaches to the same subject by different authors.

No. of References: None
Facilities: None

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, Igor' Viktorovich, doktor tekhnicheskikh nauk, professor, redaktor.

[Friction and boundary lubrication] Trenie i granichnaia smazka; sbornik statei. Pod red. I. V. Kragel'skogo. Moskva, Izd-vo inostrannoi lit-ry, Upr. nauch. informatsii, 1953. 288 p. (MLRA 7:7)
(Friction) (Lubrication and lubricants)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

GROZIN, B.D., otvetstvennyy redaktor; ISHLINSKIY, A.Yu., redaktor; KRAGEL'SKIY, I.V., redaktor; SERENSEN, S.V., redaktor; FAYNERMAN, I.D., redaktor; RUDENSKIY, Ya.V., tekhnicheskiy redaktor.

[Increasing wear resistance and the life of machinery] Povyshenie iznosostoikosti i sroka sluzhby mashin. Kiev, Gos. nauchno-tekhn. izd-vo mashinostroit. i sudostroit. lit-ry, 1953. 434 p. [Microfilm]
(Mechanical wear) (MIRA 8:2)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

ACHERKAN, Naum Samuilovich, 1872- , doktor tekhnicheskikh nauk, professor, redaktor; BELYAYEV, V.N., dotsent, kandidat tekhnicheskikh nauk; BIDERMAN, V.L., kandidat tekhnicheskikh nauk; BOROVICH, L.S., kandidat tekhnicheskikh nauk; GASHINSKIY, A.G., inzhener; GORODETSKIY, N.Ye., professor, doktor tekhnicheskikh nauk; IVANOV, B.A., professor, doktor tekhnicheskikh nauk; KOLMIYTSEV, A.A., dotsent, kandidat tekhnicheskikh nauk; KRAGEL'SKIY, I.V., professor, doktor tekhnicheskikh nauk; PETRUSEVICH, A.I., doktor tekhnicheskikh nauk; POZDNYAKOV, S.N., dotsent; PONOMAREV, S.D., professor, doktor tekhnicheskikh nauk; PORTUGALOVA, A.A., kandidat tekhnicheskikh nauk; PRONIN, B.A., kandidat tekhnicheskikh nauk; RESHETOV, D.N., professor, doktor tekhnicheskikh nauk; RESHETOV, L.N., professor, doktor tekhnicheskikh nauk; SAVERIN, M.A., professor, doktor tekhnicheskikh nauk; SAVERIN, N.A., kandidat tekhnicheskikh nauk; SLOBODKIN, M.S., inzhener; SPITSYN, N.A., professor, doktor tekhnicheskikh nauk; STOLBIN, G.B., dotsent, kandidat tekhnicheskikh nauk; UMNOV, V.A., inzhener; CHERNYAK, B.Z., kandidat tekhnicheskikh nauk; SHCHEDROV, V.S., dotsent, kandidat tekhnicheskikh nauk.

[Machine parts; collection of materials on calculation and design in two volumes; vol.1] Detali mashin; sbornik materialov po raschetu i konstruirovaniiu. Izd.2., ispr.i dop. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. i sudostroit. lit-ry, 1953- . (MLRA 6:11)

(Machinery--Design)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY

ACHERKAN, N.S., doktor tekhnicheskikh nauk, professor, redaktor;
BELYAYEV, V.N., kandidat tekhnicheskikh nauk, dotsent;
BIDERMAN, V.L., kandidat tekhnicheskikh nauk; BOROVICH, L.S., kandidat tekhnicheskikh nauk; GASHINSKIY, A.G., inzhener; GORODETSKIY, I.Ye., doktor tekhnicheskikh nauk, professor; IVANOV, B.A., doktor tekhnicheskikh nauk, professor; KOLOMIYTSEV, A.A., kandidat tekhnicheskikh nauk, dotsent; KRAGEL'SKIY, I.V., doktor tekhnicheskikh nauk, professor; MAZYRIN, I.V., inzhener; NIKOLAYEV, G.A., doktor tekhnicheskikh nauk, professor; PETRUSEVICH, A.I., doktor tekhnicheskikh nauk; POZDNYAKOV, S.N., dotsent; PONOMAREV, S.D., doktor tekhnicheskikh nauk, professor; PORTUGALOVA, A.A., kandidat tekhnicheskikh nauk; PRONIN, B.A., kandidat tekhnicheskikh nauk; RESHETOV, D.I., doktor tekhnicheskikh nauk, professor; RESHETOV, L.N., doktor tekhnicheskikh nauk, professor; SAVERIN, M.A., doktor tekhnicheskikh nauk, professor; SAVERIN, M.M., kandidat tekhnicheskikh nauk; SLOBODKIN, M.S., inzhener; SPITSYN, N.A., doktor tekhnicheskikh nauk, professor; STOLBIN, G.B., kandidat tekhnicheskikh nauk, dotsent; UMNOV, V.A., inzhener; CHERNYAK, B.Z., kandidat tekhnicheskikh nauk; SHCHEDROV, V.S., kandidat tekhnicheskikh nauk, dotsent.

[Machine parts; collection of materials on calculation and design in two volumes] Detali mashin; sbornik materialov po raschetu i konstruirovaniiu v dvukh knigakh. Izd.2. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit.i sudostroit.lit-ry. Vol. 2. 1953. 560 p. (MLRA 6:12)

(Machinery--Design)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

SHVETSOVA, Ye.M.; KRAGEL'SKIY, I.V.

Classification for types of destruction in machine part surfaces under conditions of dry and limiting friction. Tren. i izn.mash. no.8:18-38 '53. (MLRA 6:7)

(Friction) (Surfaces (Technology))

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGELSKIY, I. V.

USSR/Engineering - Friction 11 Aug 53

"Effect of the Ratio of Frictional Area to Hardness on Sliding Conditions in Machine Parts in Contact," D. N. Garkunov and I. V. Kragelskiy

DAN SSSR, Vol 91, No 5, pp 1085-1088

Utilize special equipment, designed by I. V. Kragelskiy and B. I. Kostetskiy, which compresses the sample between two small cylinders, to study forces of friction. Present results in graph and table. Presented by Acad P. A. Rebinder 11 Jun 53.

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I.V.; BESSONOV, L.F.; SHVETSOVA, Ye.M.; REBINDER, P.A., akademik.

Contacting lapped surfaces. Dokl.AN SSSR 93 no.1:43-46 N '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Rebinder). (Surfaces (Technology))

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KOROVCHINSKIY, M.V.; KRAGEL'SKIY, I.V., doktor tekhnicheskikh nauk, professor, retsenzent; MANAKIN, N.V., inzhener, redaktor.

[Applied theory of lubricated sliding bearings] Prikladnaia teoriia podshipnikov zhidkostnogo treniia. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. i sudostroit. lit-ry, 1954. 185 p. (MLRA 7:6)
(Bearings (Machinery)) (Friction)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I.V.

Role of Russian scientists in the development of dry friction theory. Trudy po ist.tekh. no.7:20-32 '54. (MLRA 7:7)
(Friction)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I.V.; VINOGRADOVA, I.E.: SLOBODYANNIKOV, S.S., kandidat tekhnicheskikh nauk; POPOVA, S.M., tekhnicheskiy redaktor.

[Coefficients of friction; a reference manual] Koeffitsienty treniia; spravochnoe posobie. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1955. 188 p. (MLRA 8:8)
(Friction)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I.V.; CHUPILKO, G.Ye; CHICHINADZE, A.V.; KUDASHEV, A.I., redaktor; ASTAF'YEVA, G.A., tekhnicheskiy redaktor.

[Friction processes in airplane wheel brakes. Selection of frictional pairs] Protsessy treniia v tormozakh aviakoles.Podbor friktsionnykh par. Moskva, Izd-vo Akademiii nauk SSSR, 1955. 189 p. (MLRA 9:4)
(Airplanes--Landing gear) (Brakes)

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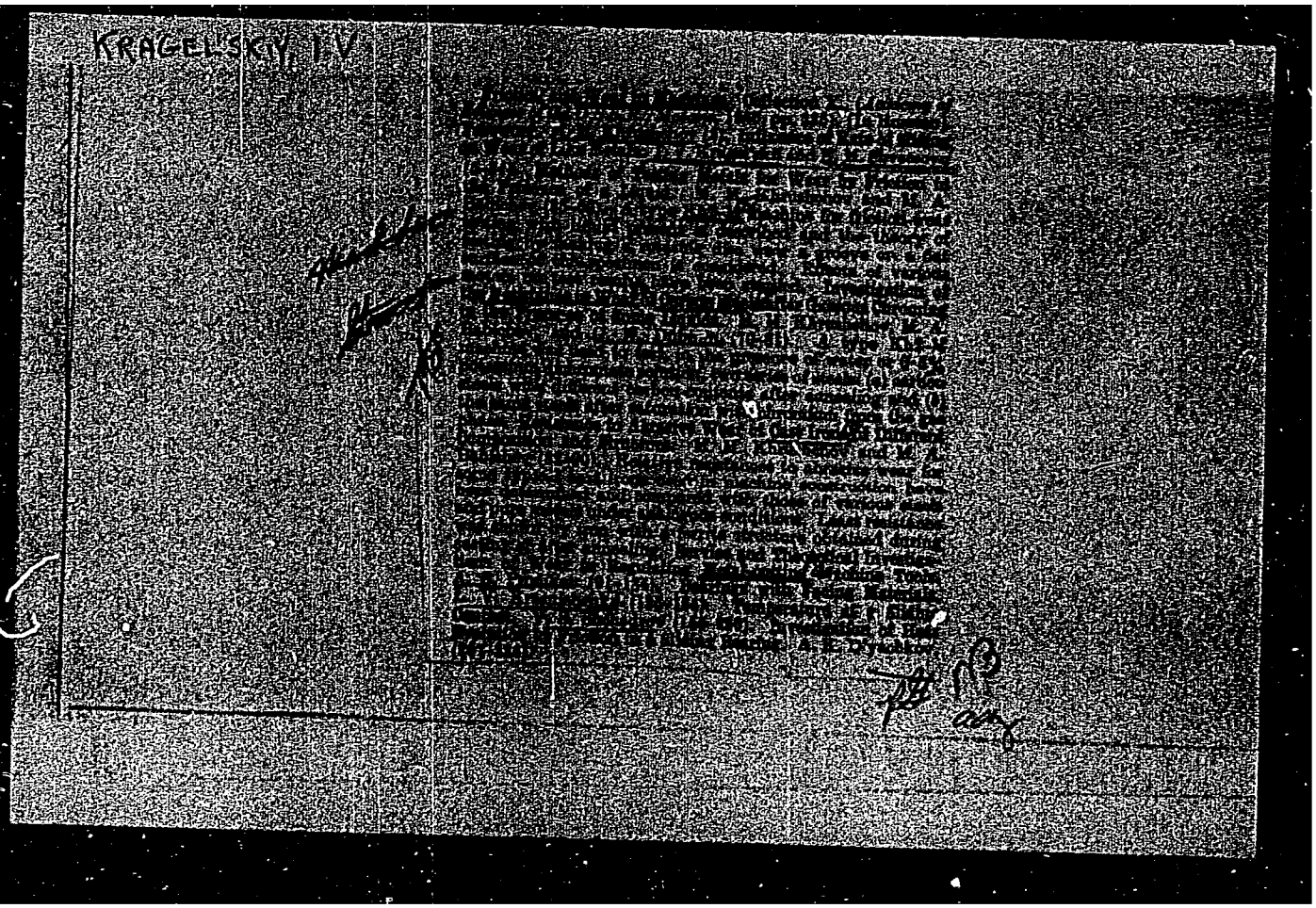

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KRAGEL'SKIY, I. V.

USSR/ Scientific Organization - Conferences

Card 1/1 Pub. 124 - 36/45

Authors : Kragel'skiy, I. V., Dr. of Tech. Sci., and Gudchenko, V. M.

Title : Conference on the theory of friction and wear

Periodical : Vest. AN SSSR 2, 98-101, Feb 1955

Abstract : The problems of reducing friction and wear of machines were discussed at the conference called by the Institute of Machine Construction of the Academy of Sciences USSR (Nov. 15-17, 1954). The proposals made for the purpose of reducing the wear of machines are stated.

Institution : .....

Submitted : .....

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, Igor' Viktorovich; SHCHEDROV, Viktor Sergeyevich; ISHLINSKIY, A.Yu., otvetstvennyy redaktor; TANNIS, I.G., redaktor izdatel'stva; SOMOROV, B.A., tekhnicheskiy redaktor

[Development of the science of friction; dry friction] Razv ie nauki o trenii; sukhoe trenie. Moskva, Izd-vo Akademii nauk SSSR, 1956. 233 p. (MLRA 9:7)

1. Deystvitel'nyy chlen Akademii nauk USSR (for Ishlinskiy)
(Friction)

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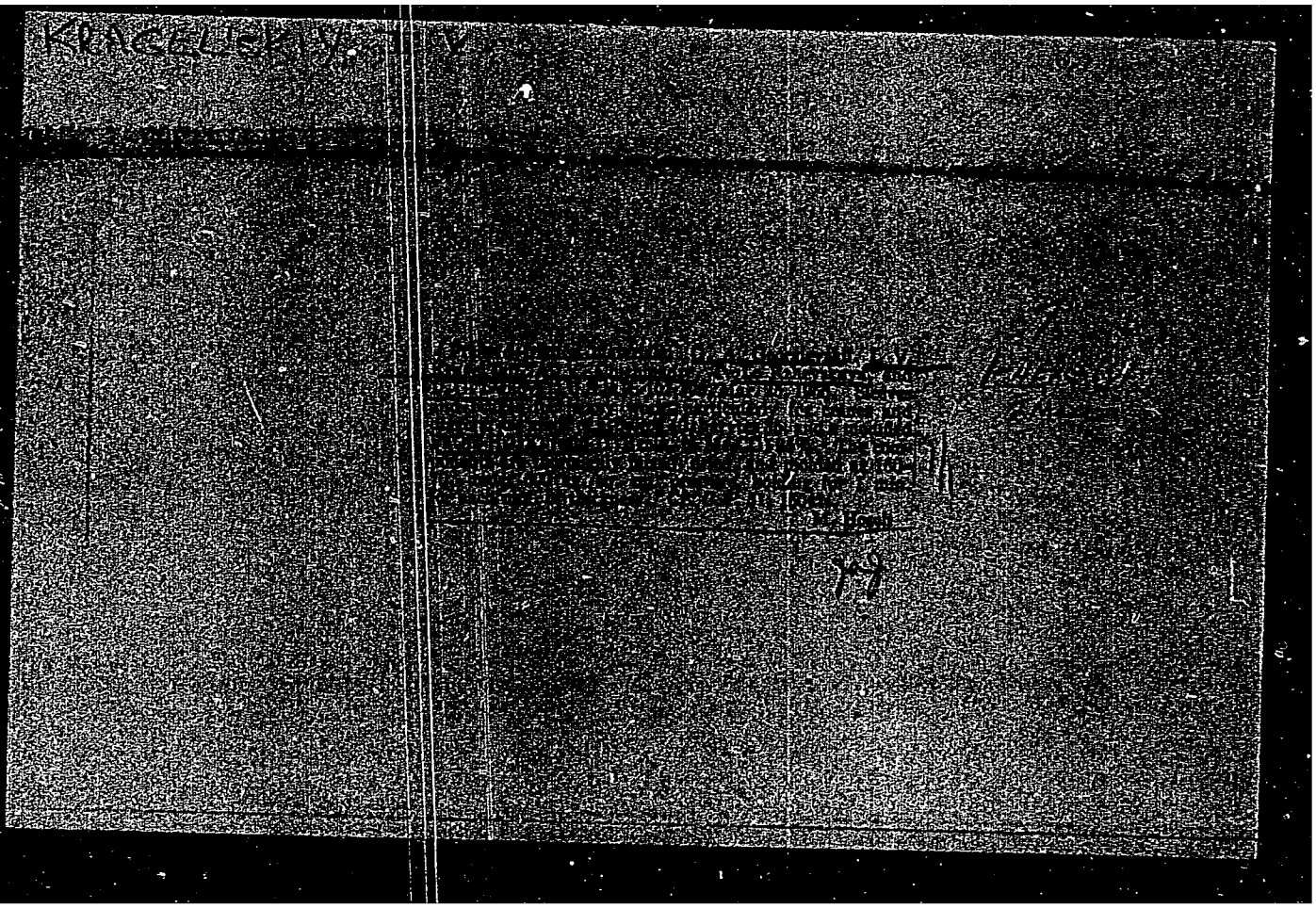

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

SOV/124-57-7-7575

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 7, p 16 (USSR)

AUTHORS: Kosterin, Yu. I., Kragel'skiy, I. V.

TITLE: Why Automobile Clutches Grab and Chatter (Prichiny zakhvatyvaniya i vibratsiy v avtomobil'nom stseplenii)

PERIODICAL: V sb.: Konstruirovaniye, issledovaniya, ispytaniya avtomobilev. Nr 2. Moscow, Mashgiz, 1956, pp 64-76

ABSTRACT: The grabbing and self-sustaining chatter of automobile clutch mechanisms upon engagement are accounted for in terms of the relationship found to exist between the friction coefficient of the two contacting surfaces, on the one hand, and the slippage speed and duration of static contact, on the other. Included are photographs of testing devices, and an account is given of methods for determining the friction coefficient of friction materials.

K. S. Kolesnikov

Card 1/1

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

Kragel'skiy, I. V.

USSR/ Engineering - Conferences

Card 1/1 Pub. 124 - 28/39

Authors : Kragel'skiy, I. V., Dr. of Tech. Sc., and Lazarev, G. Ye.

Title : Methods of testing friction materials

Periodical : Vest. AN SSSR 26/2, page 125, Feb 1956

Abstract : Minutes are presented from the conference held at the Inst. of Machine Construction of the Academy of Sc., USSR (Dec. 9-10, 1955) where the subject of testing friction materials used in brakes, clutches, and couplings of various machines was discussed.

Institution : .....

Submitted : .....

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I. V. and TROYANOVSKAYA, G. I.

"Effect of Temparature on Friction Characteristics" in book Research in the Physics of Soldids, Moscow, Izd-vo AN SSSR, 1957. 277 p. Ed. Bol'shanina, M. A. Tomsk Universitet, Sibirskiy fiziko-tekhnicheskiy institut.

The following materials were used in experiments: plastics FK-24A and 6KKh-1 and metal ceramic MK-2, and as the second element of the friction pair cast iron ChNMKh, SCh-21-40, and steel 45. The machine used was type I-47-K-54, and There are 9 figures, and 15 references, 7 of which are Soviet.

This collection of artickles is meant for metallurgical physicists and for engineers of the metal-working industry. This book contains results of research in the field of failure and plastic deformation of materials, mainly of metals. Problems of cutting, abrasion, friction, and wear of solid materials. (Metals) are discussed.

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGELSKIY, I. V.

"Calculation of Dry-friction Forces,"

paper submitted for presentation at the Conference on Lubrication and Wear, London, 1-3 October 1957.

The Chartered Mechanical Engineer, Sep 57, p. 340-341

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGELSKIY, I. V. and V. P. Sabelnikov

"Experimental Check of Elementary Law of Boundary Friction (Dry Friction)",

paper submitted for presentation at the Conference on Lubrication and Wear, London, 1-3 October 1957.

The Chartered Mechanical Engineer, Sep 57, p. 340-342

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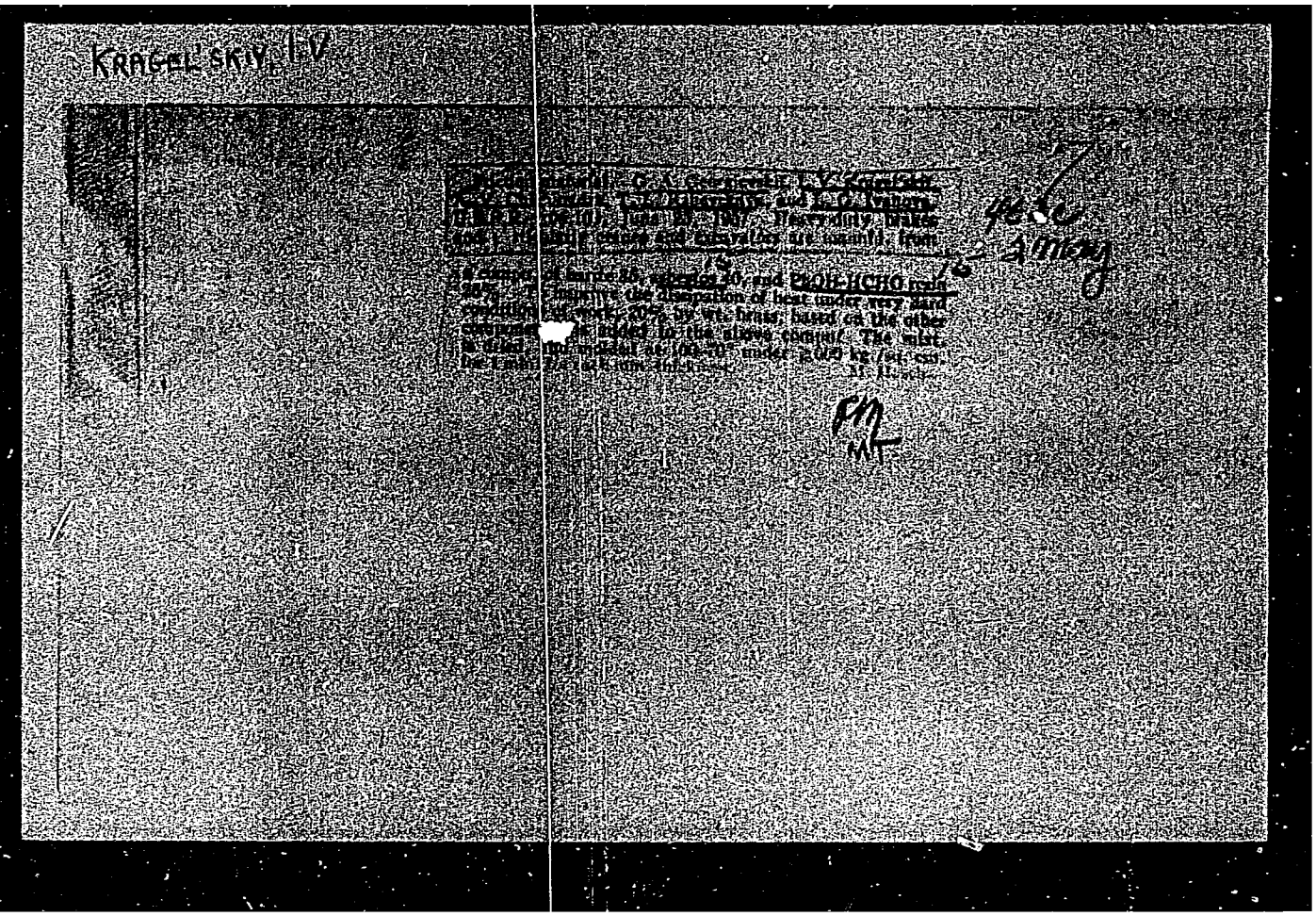

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I. V.

137-58-5-10609

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 249 (USSR)

AUTHOR: Kragel'skiy, I. V.

TITLE: The State of the Knowledge on Dry Friction and Trends for its Evolution. The Role of Dry Friction in Modern Engineering (Nauka o sukhom trenii, yeye sostoyaniye i puti razvitiya. Rol' sukhogo treniya v sovremennoy tekhnike)

PERIODICAL: V sb.: Razvitiye teorii treniya i iznashivaniya. Moscow, AN SSSR, 1957, pp 7-14

ABSTRACT: A survey of the literature on the present state of the knowledge on dry friction (F) is presented. Problems related to the study of structural transformations in materials subject to the effects of temperature and pressure at high rates of slide and in the presence of a gaseous medium, also of various lubricants, are formulated. Bibliography: 48 references.

V.N.

1. Metals--Friction

Card 1/1

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I.V.

137-58-5-10607

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 5. p 249 (USSR)

AUTHOR: Kragel'skiy, I.V.

TITLE: Fundamental Principles of the Molecular-mechanical Theory of Friction and Wear (Osnovnyye polozheniya molekulyarno-mekhanicheskoy teorii treniya i iznashivaniya)

PERIODICAL: V sb.: Razvitiye teorii treniya i iznashivaniya. Moscow, AN SSSR, 1957. pp 108-116

ABSTRACT: An examination is made of the fundamental principles of the molecular-mechanical theory of wear (W) and friction (F), and certain general principles of the processes of F and W in metals are formulated. A diagram is presented for the calculation of the forces of static F (within the limits of preliminary displacement) for cases in which the forces of F effect a rigid connection between two surfaces (clutch couplings, driving wheels) and for the forces of sliding F relative to braking and the work of various sliding supports for parts of machinery. In view of the discrete nature of the contact between solids, the concept of an elementary specific force of F developing per unit of effective area of contact between the mating bodies is suggested. The

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Fundamental Principles of the (cont.)

total force of F is calculated as the sum of the elementary forces of F acting at all the points of contact. A diagram for calculation of the intensity of the process of W is introduced. The intensity of W of a material is defined as the ratio of the number of projections subjected to a process of destruction to the total number of projections in contact. It is noted that reduction in intensity of W requires a reduction in the weight of the particle torn away, in the closeness of contact, and in the difference between the total number of projections and the number of projections undergoing elastic deformation. Two fundamental rules are formulated on the basis of the method of analysis of the W process thus developed. The first of these applies to mechanical interaction when it is important to provide mutual penetration of the contacting bodies of such nature that the surface layers remain in contact with the parent mass of substance. This is accomplished either by reducing the magnitude of mutual penetration by employment of extremely rigid materials (the principle of maximum rigidity) or by employment of extremely soft materials capable of high deformation without losing connection with the main mass of material even under conditions of high mutual penetration (the principle of maximum yield). The second rule is applicable to molecular action, in which localization of disruption of contacts in an area as close as possible to the point of molecular interaction is significant. Bibliography: 14 references. L. G.

Card 2/2 1. Metals--Friction 2. Metals--Mechanical properties

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

AUTHOR GARKUNOV, D.N., KRAGEL'SKII, I.V., PA - 3023

TITLE On Atomic Capture from Solids in Friction.
(Ob atomarnom skhvatyvanii materialov pri trenii - Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 2, pp 326-327,(U.S.S.R.)
Received 6/1957 Reviewed 7/1957

ABSTRACT On the occasion of friction of two surfaces an intensive diffusion can take place as a consequence of the plastic deformation of the surface layers. This was ascertained in the case of friction of bronze against steel by watching the selestive diffusion. A sufficiently thick layer which consists in the main of the copper eliminated from the solid solution, appeared on the surface of the steel sample. It is just this phenomenon that describes the selective atomic intermeshing. The enrichment of copper on the surface offriction was ascertained by roentgen-structure analysis. The selective intermeshing can also be ascertained by radioactive zinc. In the surface layer that has appeared the radioactive zinc decreased as against its content in the original bronze by 10-15 times. The experiments were carried out by means of a friction machine with reciprocating motion (100 reciprocating motions of 50mm lenght per minute). Two sorts of bronze were investigated. In the case of a friction lasting 30 to 40 minutes of one of the sorts of bronze against steel in an alcohol-glycerol mixture a thin bronze layer enriched by copper was smeared on the steel sample. In a test lasting for 20 to 30 hours of the same bronze - steel pair with increased stresses (120 kg/cm^2) the thickness of this layer increased perceptibly. On

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On Atomic Capture from Solids in Friction. PA - 3023

the friction surface of the bronze sample a bronze layer enriched by copper did not appear. In the case of friction of the other sort of bronze against steel a bronze layer enriched by copper arose both on the bronze and on the steel. This layer did not become thicker enough in consequence of increased duration of testing. When the alcohol-glycerol mixture was replaced by oil "MS", no atomic intermeshing did occur in both cases of the here investigated friction pairs. Such atomic intermeshing is not only noticed in the case of metals but in the case of graphite as well. Friction pairs can be put together which practically do not suffer any attrition. The metal here passes from one surface to the other and then returns to the first surface.
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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

SEMENOV, Aleksandr Pavlovich; KRAGEL'SKIY, I.V., prof., doktor tekhn. nauk, retsenzent; KORABLEVA, P.M., inzh., red.; ML'KIND, V.D., tekhn. red.

[Seizure of metals] Skhvatyvanie metallov. Izd.2., perer. i dop. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1958. 279 p. (MIRA 11:10)
(Metals) (Friction)

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGel'skiy, I.V.

8(2) PHASE I BOOK EXPLOITATION SOV/1855

Soveshchaniye po elektricheskim kontaktam. Moscow. 1956.

Elektricheskiye kontakty; trudy soveshchaniya (Electrical Contacts; Transactions of the Conference) Moscow, Gosenergoizdat, 1958. 303 p. 4,150 copies printed.

Editorial board: B.S. Sotskov (Resp. Ed.), V.V. Usov, R.S. Kuznetsov, I.Ye. Dekabrun, and Z.S. Kirillova; Ed.: I.Ye. Dekabrun; Tech. Ed.: K.P. Voronin.

PURPOSE: This collection of articles is intended for engineers and technicians designing, developing and operating electrical apparatus and is concerned with electric contact materials. It may also be useful in scientific research institutes and laboratories.

COVERAGE: This book comprises reports delivered at the Electric Contacts Conference held in Moscow in November, 1956. These papers cover physical processes occurring during connecting or disconnecting, methods of designing and testing electric contacts, production and characteristics of contact materials. During this conference of the Institut avtomatiki telemekhaniki AN SSSR (Institute of Automation and Telemechanics, Academy of Sciences, USSR) participants approved periodic conferences of physicists, metallurgists, chemists and apparatus design specialists to discuss problems of electric contacts, which are the components of electric

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Electrical Contacts (Cont.) SOV/1855

apparatus primarily influencing the reliability of electric systems, especially d-c control systems. Their physical, thermal, mechanical and chemical processes have still not been well analyzed. References are given at the end of most of the reports.

TABLE OF CONTENTS:

According to the author, ideal smooth surfaces of mica protrusions measure 20 A, on the best quartz crystal 100 A, on highly polished metal surfaces 0.05 - 0.1 micron, and on rough metal surfaces 100-200 microns. Moreover, the machined surfaces usually have a wavy structure. The author has devoted his paper to finding methods of calculating the actual area of contact of surfaces. After a detailed theoretical and practical analysis he derives formulas for practical use by designers. There are 6 references, of which 5 are Soviet and 1 English.

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I.V.

28(5) PHASE I BOOK EXPLOITATION SOV/2632

Akademiya nauk SSSR. Institut mashinovedeniya

Treniye i iznos v mashinakh; sbornik XII (Friction and Wear in Machines; Collection 12) Moscow, Izd-vo AN SSSR, 1958. 354 p. Errata slip inserted. 4,000 copies printed.

Ed.: M.M. Khrushchov, Professor; Ed. of Publishing House: M.A. Babichev; Tech. Ed.: Ye.V. Zelenkova; Editorial Board: Ye.M. Gut'yar, Professor, A.K. D'yachkov, Professor, I.V. Kragel'skiy, Professor, A.D. Kuritsyna, Candidate of Technical Sciences, L.Yu. Pruzhanskiy, Candidate of Technical Sciences, and M.M.Khrushchov, Professor.

PURPOSE: This book is intended for scientists, engineers, and technicians in the field of machine manufacture and operation, and for instructors in schools of higher education (vuzes).

COVERAGE: This collection of articles presents the results of new investigations in the field of wear, friction, and lubrication. The subjects discussed include structural changes in the surface layer of metals in friction, development of friction-brake materials, and theoretical investigations in the field of dry friction and friction with boundary and complete friction. For the abstract of each article see the Table of Contents. A bibliography of Soviet and non-Soviet materials on friction, wear and lubrication for 1954-55 prepared by Ye.O. Vil'dt is included.

Grozin, B.D., and V.N. Semirog-Orlik. Investigating the Condition of the Surface Layer of Metal Using an Electron Microscope 64

The use of electron microscopes makes it possible to investigate changes taking place on surfaces and in surface layers of metal parts without preparation of the microsections regardless of the shape and size of a part.

Gudchenko, V.M., and I.V. Kragel'skiy. Basis for Developing Friction Materials for High-tension Brakes 78

The authors present generalized results of their experimental investigations in developing a theory of friction materials.

Kosterin, Yu.I. and I.V. Kragel'skiy. Relaxation Vibrations in Elastic Friction Systems 119

The author analyzes the previously proposed "stick-slip" theory of the process of friction and establishes a new theory dedermining conditions which prevent "stick-slip" processes in friction.

Marochkin, V.N. Calculation of the Coefficient of Friction as Applied to Two Rough Surfaces 144

The author presents a theory of friction applied to two rough surfaces in contact. This is a further development of the theory proposed by I.V. Kragel'skiy.

Karatyshkin, S.G. On the Theory of Oil Film in a Dynamically-loaded Bearing 163

The author describes results of his experimental determinations of lubricating oil-film pressures in the crank shaft bearings of a diesel engine. Use wasmade of strain gages installed in shaft journals under various operating conditions.

6

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KOSTERIN, Yu.I.; KRAGEL'SKIY, I.V.

Relaxation vibrations in elastic friction systems. Tren. i izn., mash. no. 12:119-143 '58. (MIRA 11:8)
(Friction)
(Vibration)

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

S/139/59/000/05/019/026
E201/E191

AUTHOR: Kragel'skiy, I.V.

TITLE: Wear Resulting from Repeated Deformation of Surface Layers (the Special Case of a Deformable Surface in Contact with an Absolutely Rigid Rough Surface)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, 1959, Nr 5, pp 119-127 (USSR)

ABSTRACT: The author considers interaction of an absolutely rigid rough surface with a deformable body and calculates the volume of penetration. On sliding this volume will be repeatedly deformed elastically or plastically. As the result of such repeated deformation the deformable body is ruptured. Wear resistance of a material is shown to be governed by the deformed volume and the number of deformation cycles. Wear is therefore a process which can be regarded as fatigue of the surface layers. The author introduces the concepts of specific wear intensity, which is wear related to the true contact area. Dependences obtained by the author can be used to calculate the wear intensity as a function of the properties of the material, the load applied and other

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E201/E191

Wear Resulting from Repeated Deformation of Surface Layers (the Special Case of a Deformable Surface in Contact with an Absolutely Rigid Rough Surface)

factors. Particular cases of such dependences are the laws of wear in the case of plastic and elastic contacts. The paper is entirely theoretical.
There are 4 figures and 9 references, of which 6 are Soviet, 2 English and 1 German.

Card
2/2

ASSOCIATION: Moskovskiy institut mashinovedeniya AN SSSR
(Moscow Machine Institute, Academy of Sciences USSR)

SUBMITTED: May 23, 1959

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

S/138/59/000/011/005/011
A051/A029

AUTHOR: Kragel'skiy, I. V.

TITLE: The Wear in Rubber Used for Tire Treads

PERIODICAL: Kauchuk i Rezina, 1959, No. 11, pp. 20-26.

TEXT: The causes of deterioration in tread rubber and on the methods of making rubber more resistant against wear are discussed. 1) The contact of two bodies is discussed and a mathematical treatment of the theory involved is given (Formulae 1-13). It is pointed out that in laboratory tests the wear intensity is determined by the loss in volume, related to the friction work, i.e., the specific wear (Formula 3). However, this characteristic is not considered, since tests carried out under similar conditions during the performance of tires have proven to be too difficult. Two cases are considered: a tire tread with a smooth surface and a tread with a profile. The general wear is computed from the sum of the individual wear on each of the elevations on the tread, which are in simultaneous contact with the road. 2) The interaction and the destruction of the friction surface has a double molecular-mechanical nature. Certain types

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The Wear in Rubber Used for Tire Treads

of changes are listed which can take place due to repeated deformations and intense heating on the surface layer of the rubber: a) temperature changes reaching 100°C; this figure added to the "volume" temperature which reaches 60-80°C in the summer, would be enough to cause severe drops in the strength of rubber, made both of synthetic and natural rubber; b) oxidation of the surface layer can result in the tear resistance dropping from 120 to 20 kg/cm in the case of natural rubber at 100°C; oxidation of the rubber causes structuralizing to take place, and as a result the rubber becomes harder, less elastic; c) fatigue of the rubber can result due to a tear in the different chains forming radicals which, in turn, can react with admixtures present in the rubber and induce chain reactions; the physico-mechanical properties change, cracks and breaks occur; the rubber becomes brittle; d) tear and strain of the "braking" surface of the rubber can occur in cases of high friction between the rubber and the road; the nature of the irregularities and the value of the molecular friction coefficient between the tread and the rubber have a significant effect on the destruction process of the material. 3) The wear of the material as a result of repeated deformations is discussed and Formulas 14-16 are derived for computing the minimum volume being deformed. A special method for testing the rubber

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against fatigue under operation conditions must be developed. 4) The separation of the brittle surface film is studied by mathematical methods (Formulas 17, 18). The thickness of the film which forms during the period between two contacts and, consequently, the wear intensity can be calculated by the given formulas. 5) The tangential resistance (i.e., the friction force), occurring at a relative sliding of the two surfaces is also calculated. Some of the existing laboratory methods should be improved. Any form of wear depends on the volume of material subjected to repeated deformations. The nature of the changes which take place and that of the destruction depend on the number of cycles, n, bringing about the separation of the changed tread layer from the rest of the tire. Under normal conditions the wear resistance of the tread can be increased by increasing the fatigue resistance and maintaining the surface unchanged from its original form, i.e., maintaining its original properties. There are 4 graphs, 18 formulas and 18 references: 14 Soviet, 4 English.

ASSOCIATION: Institut mashinovedeniya Akademii Nauk SSSR i nauchno-issledovatel'skiy institut shinnoy promyshlennosti
(Institute of the Science of Machines of the USSR AS and the Scientific Research Institute of the Tire Industry)

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AUTHOR: Kragel'skiy, I. V.

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SOV/20-129-5-15/64

TITLE: The Criteria for the Wear of Materials

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 5, pp 1016-1019 (USSR)

ABSTRACT: The author suggests a new criterion for estimating wear, viz. the specific wear $i_q = (q_x/A_r 2a)\ [g/cm^3]$, $i_h = V_x/A_r \cdot 2a$. q_x is the quantity of worn substance, V_x - its volume; A_r denotes the actual contact area, 2a is the path along which wear takes place; i_h is the linear wear (h denotes the thickness of the worn layer, q - its weight). The author investigates the correlation between these criteria and their relative advantages for the case of contact between an absolutely rigid and rough surface and the body to be deformed. The reproducibility of surface roughness in the case of steady wear is a rigorously proved law. The following three cases seem to lead to the reproducibility of roughness: 1. The solid protrusions penetrating into the material cut chips from the softer material after the manner of a chisel. In this case the material is

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

The Criteria for the Wear of Materials

separated by a single disturbance of friction bond. 2. The protrusions deform the material elastically without destroying it. In this case no material is separated in an elastic body, not even in the case of innumerable disturbances of the friction bonds. 3. The protrusions penetrating into the material deform it by repeated (n-fold) plastic displacement. The latter is an intermediate case, which is the most frequent: it represents wear in its proper sense. The author then calculates the minimum volume which participates in the deformation during the displacement of the surface to be deformed (in a manner that corresponds to the reproducibility of roughness). In the case of multiple deformation, the work $W = V_1 c \sigma_S n$ (according to a definition given by V. P. Goryachkin et al.) has to be expended; V_1 denotes the absolute volume, σ_S - the flow limit, c - a coefficient depending on the geometric conditions of the matrix and on the adhesiveness of the material. For the resistance to wear $R_W = c\sigma_S n$ holds. The well-known statement made by P. A Rebinder that the specific dispersion work is proportional to hardness applies fully also to the present

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case of the destruction of a friction bond. With increasing hardness, R_w may even decrease. With a given nature of wear (n = const) the specific wear must be a constant quantity and need not depend on the mechanical properties of the material. The author calculated this specific wear i_h from the experimental data obtained by M. M. Khrushchov and M. A. Babichev (Ref 10) for various metals subjected to friction on the surface of the abrasive:

Metal	Pb	Sn	Al	Cu	steel	tungsten-carbide
$i_h \cdot 10^2$	2.75	2.18	3.93	3.33	3.72	4.0

Next, the correlation between specific and linear wear is determined. Linear wear depends on the filling-up coefficient of the surface, i.e. on stress and on the nominal dimensions of the surface. The energy criterion of wear is inversely proportional to the hardness of the material. The results obtained show the difficulty of reproducing wear on models. There are 1 figure and 14 references, 7 of which are Soviet.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

GARKUNOV, Dmitriy Nikolayevich; KRAGEL'SKIY, I.V., prof., doktor tekhn. nauk, retsenzent; YANOVSKIY, I.L., inzh., red.; SHEYNFAYN, L.I., izdat.red.; ORESHKINA, V.I., tekhn.red.

[Increasing the wear resistance of airplane parts] Povyshenie iznosostoikosti detalei samoletov. Moskva, Gos.nauchno-tekhn. izd-vo Oborongiz, 1960. 138 p. (MIRA 13:5)
(Airplanes--Design and construction)
(Mechanical wear) (Protective coatings)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGELSKIY, I.V.

report presented at the 1st All-Union Congress of Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb '60.

134. A. A. Ilyushin (Moscow): Problems of the theory of plasticity under combined loading.

135. V. K. Kabulov (Tashkent): Elastic-plastic vibrations of rods of non-circular cross section.

136. V. G. Kalinin (Leningrad): The forced non-linear flexural vibrations of a homogeneous prismatic rod and a very long rectangular plate.

137. S. Kaliski (Warsaw): On a method of solving the equations of motion for an infinite anisotropic medium in the presence of a magnetic field.

138. S. N. Kan, P. A. Mikulai (Kharkov): An engineering method for the design of open prismatic shells.

139. I. I. Kandaurov (Leningrad): The distribution of vertical compressive stresses and strains in foundations in homogeneous or stratified soils.

140. B. Ia. Kantor (Kharkov): Bending of cantilever plates of variable stiffness.

141. K. S. Karapetian (Erevan): The effect of aging and anisotropy on the creep of concrete.

142. L. M. Kachanov (Leningrad): On the time of rupture in creep.

143. L. M. Kachanov (Leningrad): On some variational principles and methods in the theory of plasticity.

144. K. A. Kerimov (Baku): A procedure of determining an impact tension diagram for large deformations.

145. L. A. Kilchevskii (Kiev): Some generalizations of the formulation of elastostatic and elasto-dynamic contact problems and methods for their solution.

146. A. Kh. Kim (Minsk): The flow of a visco-plastic medium in a cone.

147. L. A. Kitover (Leningrad): On the elastic equilibrium of thin, infinite orthotropic plates.

148. E. V. Kovalev (Kharkov): Models of the influence surfaces for the intensity of the bending moments in thin plates and shells.

149. A. D. Kovalenko (Kiev): Shallow shells of revolution of variable thickness in a three-dimensional temperature field.

150. M. Kozarov (Sofia): Dynamic stability of cylindrical and spherical shells.

151. M. Kozarov (Sofia): The influence of initial imperfections of shape on the stability of thin elastic cylindrical sandwich shells under axial compression.

152. W. T. Koiter (Delft): Elastic stability and post-buckling behavior.

153. A. S. Kondratev (Kuibishev), Ta. P. Kuznov (Orenburg): The effect of support elasticity on the natural vibrations of rods.

154. I. M. Kopev, I. A. Oding (Moscow): Strength and plasticity of "whiskers".

155. B. G. Korenev (Moscow): The design of flexible plates and beams on elastic foundation.

156. M. S. Kornishin (Kazan): Bending of rectangular shallow shells with elastic ribs.

157. M. S. Kornishin (Kazan): On the solution of the nonlinear algebraic equations of shell theory.

158. V. G. Korotkin, D. M. Tartakovskii (Leningrad): The one-dimensional problem of the consolidation of a sediment layer with variable specific weight and variable water permeability.

159. A. S. Kosmodamianskii (Saratov): The elastic equilibrium of anisotropic plate with a finite number of elliptical holes.

160. Yu. I. Kosterin (Iaroslavl), I. V. Kragelskii (Moscow): Rheological phenomena in dry friction.

161. Yu. V. Krotov (Stalinsk): Lateral stability of coupled arches with double curvature.

162. A. I. Kuznetsov (Leningrad): On the theory of plane plastic stress.

163. V. N. Kukudzhanov, L. V. Nikitin (Moscow): Propagation of elastic, visco-plastic waves in bars.

164. V. D. Kupradze (Tbilisi): The investigation of contact problems in the theory of elasticity by the method of singular integral equations.

165. N. V. Lasovskaia (Moscow): The investigation of the deformations of drains on models by the X-ray method.

166. A. Langenbach (Berlin): Application of the non-linear variational principle to some problems of the theory of elastic-plastic strains.

167. B. M. Levi (Moscow): The investigation of rheological properties of gelatin solutions.

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KOSTERIN, Yuriy Iosifovich, kand.tekhn.nauk; KRAGEL'SKIY, I.V., prof., doktor tekhn.nauk, otv.red.; ZOLOTOV, P.F., red.izd-va; YEPIFANOVA, L.V., tekhn.red.

[Natural mechanical vibrations caused by dry friction] Mekhanicheskie avtokolebaniia pri sukhom trenii. Moskva, Izd-vo Akad. nauk SSSR, 1960. 74 p. (MIRA 14:2)
(Friction) (Vibration)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I.V.

PHASE I BOOK EXPLOITATION SOV/5053

Vsesoyuznaya konferentsiya po treniyu i iznosu v mashinakh. 3d, 1958.

Iznos i iznosostoykost'. Antifriktsionnyye materialy (Wear and Wear Resistance. Antifriction Materials) Moscow, Izd-vo AN SSSR, 1960. 273 p. Errata slip inserted. 3,500 copies printed. (Series: Its: Trudy, v. 1)

Sponsoring Agency: Akademiya nauk SSSR. Institut mashinovedeniya.
Resp. Ed.: M. M. Khrushchov, Professor; Eds. of Publishing House: M. Ya. Klebanov, and S. L. Orpik; Tech. Ed.: T. V. Polyakova.

PURPOSE: This collection of articles is intended for practicing engineers and research scientists.

COVERAGE: The collection, published by the Institut mashinovedeniya, AN SSSR (Institute of Science of Machines, Academy of Sciences USSR) contains papers presented at the III Vsesoyuznaya konferentsiya po treniyu i iznosu v mashinakh (Third All-Union Conference on Friction and Wear in Machines) which was held April 9-15, 1958. Problems discussed were in 5 main areas: 1) Hydrodynamic Theory of Lubrication and Friction Bearings (Chairmen: Ye. M. Gut'yar, Doctor of Technical Sciences, and A. K. D'yachkov, Doctor of Technical Sciences); 2) Lubrication and Lubricant Materials (Chairman: G. V. Vinogradov, Doctor of Chemical Sciences); 3) Dry and Boundary Friction (Chairmen: B. V. Deryagin, Corresponding Member of the Academy of Sciences USSR, and I. V. Kragel'skiy, Doctor of Technical Sciences); 4) Wear and Wear Resistance (Chairman: M. M. Krushchov, Doctor of Technical Sciences); and 5) Friction and Antifriction Materials (Chairmen: I. V. Kragel'skiy, Doctor of Technical Sciences, and M. M. Krushchov, Doctor of Technical Sciences). Chairman of the general assembly (on the first and last day of the conference) was Academician A. A. Blagonravov. L. Yu. Pruzhanskiy, Candidate of Technical Sciences, was scientific secretary. The transactions of the conference were published in 3 volumes, of which the present volume is the first. This volume contains articles concerning the wear and wear resistance of antifriction materials. Among the topics covered are: modern developments in the theory and experimental science of wear resistance of materials, specific data on the wear resistance of various combinations of materials, methods for increasing the wear resistance of certain materials, the effects of friction and wear on the structure of materials, the mechanism of the seizing of metals, the effect of various types of lubricating materials on seizing, abrasive wear of a wide variety of materials and components under many different conditions, modern developments in antifriction materials, and the effects of finish machining on wear resistance. Many personalities are mentioned in the text. References accompany most of the articles.

WEAR AND WEAR RESISTANCE

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

GROZIN, B.D., otv.red.; DRAYGOR, D.A., zam.otv.red.; SAMOKHVALOV, Ya.A., red.toma; BRAUN, M.P., red.; FAYNERMAN, I.D., red.; KRAGEL'SKIY, I.V., red.; BARABASH, M.L., red. Prinimali uchastiye: VAYNBERG, D.V., prof.; PETRENKO, I.P., kand.tekhn.nauk; SINYAVSKAYA, M.D., inzh.; SHEVCHUK, V.A., kand.tekhn.nauk; SEMIROG-ORLIK, V.N., kand.tekhn.nauk; YANKEVICH, V.F., inzh.; GORB, M.L., kand.tekhn. nauk; RAKHLINA, M.P., tekhn.red.

[Increasing the wear-resistance and life of machinery] Povyshenie iznosostoikosti i sroka sluzhby mashin. Kiev, Izd-vo Akad.nauk USSR. Vol.2. 1960. 290 p. (MIRA 14:1)

1. Vsesoyuznoye nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Kiyevskoye oblastnoye pravleniye.
(Mechanical wear) (Machinery)

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY I. V.

PHASE I BOOK EXPLOITATION SOV/5054

Vsesoyuznaya konferentsiya po treniyu i iznosu v mashinakh. 3d, 1958.

Sukhoye i granichnoye treniye. Friktsionnyye materialy (Dry and Boundary Friction. Friction Materials) Moscow, Izd-vo AN SSSR, 1960. 302 p. Errata slip inserted. 3,500 copies printed. (Series: Its: Trudy, v. 2)

Sponsoring Agency: Akademiya nauk SSSR. Institut mashinovedeniya. Resp. Ed.: I. V. Kragel'skiy, Doctor of Technical Sciences, Professor; Ed. of Publishing House: K. I. Grigorash; Tech. Ed.: S. G. Tikhomirova.

PURPOSE: This collection of articles is intended for practicing engineers and research scientists.

COVERAGE: The collection published by the Institut mashinovedeniya, AN SSSR (Institute of Science of Machines, Academy of Sciences USSR) contains papers presented at the III Vsesoyuznaya konferentsiya po treniyu i iznosu v mashinakh (Third All-Union

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

Conference on Friction and Wear in Machines, April 9-15, 1958. Problems discussed were in 5 main areas: 1) Hydrodynamic Theory of Lubrication and Friction Bearings (Chairmen: Ye. M. Gut'yar, Doctor of Technical Sciences, and A. K. D'yachkov, Doctor of Technical Sciences); 2) Lubrication and Lubricant Materials (Chairman: G. V. Vinogradov, Doctor of Chemical Sciences); 3) Dry and Boundary Friction (Chairmen: B. V. Deryagin, Corresponding Member of the Academy of Sciences USSR, and I. V. Kragel'skiy, Doctor of Technical Sciences); 4) Wear and Wear Resistance (Chairman: M. M. Krushchov, Doctor of Technical Sciences); and 5) Friction and Antifriction Materials (Chairmen: I. V. Kragel'skiy, Doctor of Technical Sciences, and M. M. Krushchov, Doctor of Technical Sciences). Chairman of the general assembly (on the first and last day of the conference) was Academician A. A. Blagonravov. L. Yu. Pruzhanskiy, Candidate of Technical Sciences, was scientific secretary. The transactions of the conference were published in 3 volumes of which the present is the second. This volume contains articles on friction materials, and on various aspects of dry friction and boundary lubrication. Among the broad areas covered are: the

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

physical mechanism of friction, measurement of friction between various pairs of contacting surfaces, seizing and the breakdown of surfaces, theories and mechanics of boundary lubrication, self-excited frictional vibrations, heat generated by friction, the effects of such heat, temperature and pressure distribution in brakes, wear resistance and other properties of friction materials, etc. References accompany most of the articles.

TABLE OF CONTENTS:

DRY FRICTION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

KRAGEL'SKIY, I. V.

PHASE I BOOK EXPLOITATION SOV/3948

Akademiya nauk SSSR. Institut mashinovedeniya

Treniye i iznos v mashinakh; sbornik XIV (Friction and Wear in Machinery; Collection of Articles, no. 14) Moscow, Izd-vo AN SSSR, 1960. 333 p. Errata slip inserted. 3,000 copies printed.

Resp. Ed.: M. M. Khrushchov, Doctor of Technical Sciences, Professor; Ed. of Publishing House: V. A. Giryayeva; Tech. Ed.: G. A. Astaf'yeva; Editorial Board: Ye. M. Gut'yar, Doctor of Technical Sciences, Professor; A. K. D'yachkov, Doctor of Technical Sciences, Professor; I. V. Kragel'skiy, Doctor of Technical Sciences, Professor; A. D. Kuritsyna, Candidate of Technical Sciences; L. Yu. Pruzhanskiy, Candidate of Technical Sciences; and M. M. Khrushchov, Doctor of Technical Sciences, Professor.

PURPOSE: The book is intended for scientific research workers and designers in the machine industry.

COVERAGE: The recent works of Soviet scientists on the subject of friction and wear in machinery are presented. Problems discussed include abrasive wear, the real

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

area of contact surface, wear resistance and antifriction properties of some bronze and brass materials, the effect of hot jets of gases on surface layers of steel, and seizure and movements of journals in bearings. Brief biographical sketches and bibliographies of the works of Ye. M. Shvetsova, V. F. Lorents, and L. V. Yelin are presented. Bibliographies on friction, wear, and lubrication for 1956 and 1957 compiled by Ye. O. Vil'dt are also presented. References accompany several of the articles.

TABLE OF CONTENTS:

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

GROZIN, B.D., otv.red.; DRAYGOR, D.A., zam.otv.red.; BARABASH, M.L., red.toma; KRAGEL'SKIY, I.V., red.; SERENSEN, S.V., red.; FAYNERMAN, I.D., red.; ZASLAVSKIY, S.S., red. Prinimali uchastiye: BRAUN, M.P., prof.; VAYNBERG, D.V., prof.; PETRENKO, I.P., kand.tekhn.nauk; SINYAVSKAYA, M.D., inzh.; SHEVCHUK, V.A., kand.tekhn.nauk; SEMIROG-ORLIK, V.N., kand.tekhn.nauk; YANKEVICH, V.F., inzh.; GORB, M.L., kand.tekhn.nauk; RAKHLINA, N.P., tekhn.red.

[Increasing the wear resistance and useful life of machinery in two volumes] Povyshenie iznosostoikosti i sroka sluzhby mashin v dvukh tomakh. Kiev, Izd-vo Akad.nauk USSR. Vol.1. 1960. 486 p. (MIRA 13:12)

1. Vsesoyuznoye nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Kiyevskoye oblastnoye pravleniye.
(Mechanical wear)
(Mechanical engineering)

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

S/123/61/000/011/006/034
A004/A101

AUTHORS: Gudchenko, V. M.; Kragel'skiy, I. V.

TITLE: Methods of producing friction materials

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 11, 1961, 22-23, abstract 11A177 (V sb. "Povysheniye iznosostoykosti i sroka sluzhby mashin. v. I", Kiyev, AN UkrSSR, 1960, 102-109)

TEXT: The authors analyze the basic situation of the friction theory and investigate the friction materials utilized in the USSR and abroad. Plastics and asbestos-caoutchouc materials are the most suitable raw materials for friction materials. A deficiency of plastics and particularly of asbestos-caoutchouc materials is the low burning temperature at which they turn into powder. The coefficient of friction μ of asbestos-caoutchouc materials continually drops at increased temperatures: from 0.45-0.6 at room temperature to nearly 0 at temperatures of some 400°C. The intensity of wear of asbestos-caoutchouc materials grows with the temperature increase, moreover, at temperatures in the range of 370-400°C a catastrophic wear of the friction material can be observed. μ of plastic (resin) materials also drops in the temperature range of 100-400°C on

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

Methods of producing friction materials

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A004/A101

account of a separation of liquid fractions on the friction surface. The authors present the physical-mechanical properties in the field of application of retinax plastics of the ФК-24А (FK-24A) and ФК-16Л (FK-16L) grades. During temperature variations from 100 to 500°C μ of scorched retinax changes from 0.5 to 0.27. Above 500°C, μ is stable and equal to 0.27-0.3. The intensity of wear of this material does not exceed 70 mg/kgm · 10^{-3}. The FK-24A grade retinax has the following composition: 40% asbestos, 35% baryta and 25% phenol formaldehyde resin modified by colophony. The FK-16L retinax contains additionally 16% brass. Retinax parts are fabricated by hot pressing from briquets at a specific pressure of not less than 600 kg/cm^2, a temperature of 160-170°C and holding for 1 minute per 1 mm of part thickness. The material operates at a specific pressure of up to 20-30 kg/cm^2, a sliding speed of up to 30 m/sec and a specific braking power exceeding 500 kgm/cm^2. There are 2 figures and 15 references.

G. Mekhed

[Abstracter's note: Complete translation]

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

S/111/60/014/000/002/015
D262/D301

11 7000

AUTHORS: Kragel'skiy, I.V., and Demkin, N.B.

TITLE: Determination of true contact areas

SOURCE: Akademiya nauk SSSR. Institut mashinovedeniya. Treniye i iznos v mashinakh, v. 14, 1960, 37 - 62

TEXT: In this study the effect of roughness and unevenness of surfaces on true contact area is analyzed. New formulas taking into account contacting areas of perfectly smooth surfaces and real surfaces of given geometrical parameters, also physical properties of materials and loads are deduced. The basic formulas are:

$$\eta_1 = \frac{q}{C\sigma_s} + \frac{2{,}7\,(1-\mu^2)^2\, b^{\frac{1}{\nu}} r C^{1+\frac{1}{\nu}}\, \sigma_s^{1+\frac{1}{\nu}}\, q^{1-\frac{1}{\nu}}}{h_{max} E^3}. \qquad (6)$$

($\eta_1 = A_r/A_c$, A_r - true contact area, A_c - contour contact area, q - pressure, σ_s - yield strength, E - modulus of elasticity, μ - Poisson coefficient, h_{max} - max. height of protrusions, r - radius of

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Determination of true contact areas

rounded tips of protrusions, b and ν - constants, C - coefficient of proportionality);

$$\eta_1 = \left[\frac{2{,}35\,(1-\mu^2)b^{1/\nu}r^{1/\nu}q}{2^{1/\nu}Kh_{max}^{1/\nu}E}\right]^{\frac{2\nu}{2\nu+1}}, \qquad (7)$$

(K - coefficient depending on ν); and

$$\eta_1 = \left[\frac{b^{\beta/\nu}r^{\beta}q}{2^{\beta}Kh_m^{\beta}H_y}\right]^{\frac{\nu}{\nu+\beta}}, \qquad (8)$$

(β - empirical coefficient characterizing cold hardening of material, H_y - empirical coefficient characterizing plastic deformation of material, K - coefficient depending on ν and β). For experimentally finding the true contact area an optical method was selected. The procedure is described and the apparatus illustrated. It was concluded that: 1) Mechanical characteristics of the contacting materials as well as the surface geometry have an influence on the true contact area. 2) To find the contact area Eq. (8) can be used in cases of plastic and elastic-and-plastic contacts, Eq. (7) for

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Determination of true contact areas S/711/60/014/000/002/013
D262/D301

elastic contacts, and Eq. (8) for plastic contacts with stiffening. There are 15 figures, 3 tables and 25 references: 14 Soviet-bloc and 9 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: J.F. Archard, Proc. Roy. Soc. no. 1233, v. 243, 1957; p. 190; J.F. Archard and W. Hirst, Proc. Roy. Soc., no. 1206, v.236, 1956, p. 397; J. Holliday, Proc. Inst. of Mech. Eng., no. 38, v. 169, 1955, p. 777; J. Dyson, and W. Hirst Proc. Phys. Soc., no. 412, v. 67, 1954, p. 309.

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

S/711/60/014/000/011/013
D232/D301

AUTHORS: Kragel'skiy, I.V., and Krushchov, M.M.

TITLE: In memory of Yelena Mikhaylovna Shvetsova (On the 5th anniversary of her death)

SOURCE: Akademiya nauk SSSR. Institut mashinovedeniya. Treniye i iznos v mashinakh, v. 14, 1960, 284 - 286

TEXT: Ye.M. Shvetsova, Candidate of Technical Sciences and Senior Scientific Co-worker of the Friction Laboratory of the Institut mashinovedeniya AN SSSR (Institute of Machine Sciences of the AS USSR), was born in 1906 and died on June 30, 1953. Graduating as a mechanical engineer in 1930, she took up work the following year at the Avtotraktornyy institut (Institute of Motor Vehicles and Tractors) and, in 1948 at the Institute of Machine Sience. Shvetsova specialized in the study of friction and wear in machines and in the mechanical testing of materials. She contributed to the standardization of impact testing of steels and worked on classifying the various types of damage caused by friction. A bibliography containing 14 works published by Shvetsova between 1933 and 1955 is given.

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

SHALLAMAKH, A.; SMIRNOVA, L.A. [translator]; KRAGEL'SKIY, I.V. [translator]

Part played by hysteresis in tire wear and in laboratory abrasion.
Kauch.i rez. 19 no.8:58-63 Ag '60. (MIRA 13:9)
(Tires, Rubber--Testing)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010012-1

S/030/60/000/011/012/026
B021/B056

AUTHORS: Kragel'skiy, I. V., Domkin, N. B.

TITLE: Investigation of the Deformations in the Contact Zone of Solids

PERIODICAL: Vestnik Akademii nauk SSSR, 1960, No. 11, pp. 85-87

TEXT: In the present paper the contact between two solids is investigated, which takes place also in the case of smooth bodies only at individual points. The total surface of these points is smaller by a multiple than the area of the surfaces which are in contact. When a load is increased, the number of contact areas increases, and the two surfaces approach each other. This slight approach, which amounts to microns and/or fragments of microns, is of great importance for the purpose of solving a number of tasks in modern technical engineering. Under the action of the load, the air-play decreases, and the contact surface grows. These two factors determine the thermal conductivity of contact, which in this way depends not only on the properties of the material, but also on pressure and the geometry of the surfaces. On the basis of the approximation quantity,

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